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SOME ASPECTS OF ATHLETIC BEHAVIOR

Dr. F. J. Ryan, Yale University

In the time allotted to me today, I will try to:

(1) emphasize the need of the coach for additional information about human behavior,
(2) comment briefly upon the sources where the coach might seek such information,
(3) say something about the Yale effort* to explore athletic behavior, and
(4) present the results of a research project in which many of you participated.

As a starting point for our discussion, I would like you to visualize a typical coaching day and a typical activity of that day. Let's, for the sake of illustration, assume that you are coaching the pole-vault. The vaulter moves down the runway and in a matter of seconds lands in the pit. You then take coaching action.

I think we can agree that you proceed from two bases. First, you work from what you think he has done — i.e., your perception of what has taken place (for example, his shift may have been too late or he has pulled too soon). Second, you work from what you think he should be doing or "good form".

Concerning the first base, you are able to perceive details of the vault because of an apperception background. This has been built up by your interest, training, and countless observations over a long period of time. The average spectator at Madison Square Garden "sees" only the gross facts such as whether or not the cross-bar has been cleared, whereas you perceive many details, some of which occupy a small fraction of a second. Perhaps you've all had the experience of hearing a teen-ager say, "There goes a '48 Ford." When you ask him how he knows, he may enumerate many details such as the door handles, style of hood, windshield, etc. even though he has seen the car for only a fraction of a second. Of course, you'll find that he's interested in cars.

Our notions of "correct form" derive from several sources. First, there is a theoretical source; certain laws of physics indicate aspects of technique. This happens to be particularly true of the pole-vault where most inovations were made almost entirely on a theoretical basis. Second, there is an empirical source; we have tended to accept the techniques used by successful athletes. Third, to some degree we follow the teachings of men who have prestige in the field.

As coaches, our interest has been almost exclusively in techniques. A mere survey of past clinic notes will document this. More and more, I think, we work toward substantial agreement on techniques. If ten coaches in this room were to describe pole-vaulting technique to us, I think we would find them in essential agreement. Theory and the empirical approach tend to adjust to each other, and the old prestigeful concepts tend to fade if they are at variance with either theory or empirical data.

If, as time goes by, we agree increasingly on techniques, and if we develop adequate apperception backgrounds, our task becomes mainly that of behavior modification. We see on the one hand what the athlete is doing; on the other, we know what he should be doing. Our problem then becomes one of closing the gap. Of course, the obvious and straightforward approach is the instructional one; we can simply explain to the boy the nature of his task and what he is to do. However, I would suggest to you that a mere instructional approach is never completely sufficient in all cases. Increasingly we must know more about the factors that affect behavior modification.

Some sources. Because the coach needs to know more about human behavior, it would seem reasonable that he seek contributions from the behavioral disciplines. Yet, when a coach turns toward the sciences concerned with behavior, he has no small problem. After some acquaintance with these fields, one is struck by (1) the differences in areas pursued, (2) the variety of concepts each employs, (3) the approaches taken, (4) the theoretical structures each presumes, and (5) the different bases upon which each accepts evidence.

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Such differences are striking even within the single field of psychology. If we were to survey this field we could categorize it along several dimensions. So many diverse activities are carried on under the one banner of psychology that simply to know a person is a psychologist is to tell you very little about him. In fact, if two psychologists, working in different areas, with different methods and concepts, and as members of different schools, were to meet, they might find few interests in common.

Neglecting for the time being other possible and important divisions within the field of psychology, I would like to point out two rather contrasted groups. The first group might be described as formal, traditional, mathematical, experimental, and scientific. When they deal with learning, they use such concepts as: "stimulus-response", "conditioning", "reinforcement", "extinction", "habit strength", "frequency", etc.

The second group has been greatly influenced by the medical profession and particularly by the work of the analytic schools. Typical of their terms are: "need", "complex", "guilt", "aggression", "impulses","ego-strength", "unconscious", "repression", "transference", etc. As you can see, such clinically oriented psychologists borrow, themselves, generously from psychiatric concepts.

I don't mean to suggest that an eclectic position is impossible, nor would I like to create the impression that groups other than the ones indicated have nothing to contribute to coaching. Yet, the contrasting positions that I have outlined do represent poles along at least one dimension, and I feel certain that there is considerable clustering about the poles.

Discussions concerning the relative worths of these two positions have been interminable and I suppose will continue to be so. It is not within the scope of today's effort to enter into such discussions. Whether the psychologist should cast his lot professionally with one or the other group, I do not care to speculate. However, as far as the coach is concerned, there are a number of reasons to believe he might, at least at this time, benefit most from the findings of the clinician.

1. As will be indicated, the traditional laws of learning are not adequate to describe some of the most striking behavior that the coach observes.
2. The clinician deals with behavior that is richer and more complex and, therefore, more similar to that which we see.
3. The problem of the coach and the psychotherapist appear to have a clear parallel. You will recall that we described the task of the coach as that of closing the gap between what the boy is doing and "good form". Hence, both the psychiatrist and the coach are concerned with behavior modification.

The Yale effort. Discussions among coaches, particularly informal ones, often turn toward behavior problems. Common are such phrases as: "....if only this boy wouldn't blow up in competition....", "he doesn't seem to be trying as he used to", "if only he would change this simple habit". Certainly no one can coach very long without encountering tantalizing personnel hornets and seeing some baffling behavior. Over the years at Yale a number of coaches, including myself, have sought help with some of their personnel problems from the psychiatrists and psychologists of the Division of Psychiatry and Mental Hygiene in the Department of University Health. Dr. Fry, our chief psychiatrist, began to grow increasingly aware of the richness of the data that might be uncovered in the area of athletic behavior. It was his feeling that a more organized and concerted attack on this area might not only best serve the coaches, but that it might produce vital information about the college age group. About two years ago, there was inaugurated a series of conferences designed to make a preliminary survey of some of the psychological aspects of athletics.

The group's permanent personnel included several psychiatrists, a sociologist, two psychologists, an athletic coach, and our supervisor of athletic conditioning. The basic procedure consisted of meeting with coaches and asking them to give us their observations of athletic behavior. Contributions including tentative interpretations were made by all members of the group. All sessions were tape-recorded.

The meetings were never viewed as one-sided affairs in which the staff members would instruct. Instead, the coach's excellent observational position was recognized. From the material brought out at the seminars patterns and topics have been emerging and some preliminary structuring of the field has become possible.

Some of the goals of the series were: (1) the investigation of athletic behavior in its own right, (2) the gathering of information about the undergraduate, (3) the investigation of the possible application of clinical principles to coaching, and (4) the examination of the possibility that coaches' observations may afford independent validation of clinical principles and theoretical constructs.

The original format of collecting observational data from coaches through the conference method has continued to the present time. However, the sessions have produced promising hypotheses and research leads. A number of research projects have been started and it may be that direct research efforts will increasingly supplant the conferences.

The very selection of labels to designate topics and the arrangement of topics, themselves, are tentative. As time goes on, it will undoubtedly be found clarifying to reorganize much of the material. Patterns that now seem remote from each other might be seen as closely related. Nevertheless, I would like to bring you some of the flavor of the meetings. As I do so, I offer only the further caution that you will credit some of the interpretations only to the extent that you accept the principles underlying them.

Some topics of the seminars. You might, I think, find it interesting to discuss some of the phenomena that seem to condition the coach-athlete relationship.

It's almost possible to posit a principle that "if you would modify a person's behavior, be prepared to accept his hostility". Many a psychiatrist has been presented with a black eye by a patient and some have actually been shot at. This sort of behavior, of course, represents and extreme type of hostile reaction. As I will try to indicate, there are countless other channels for the expression of "hostility" in a somewhat different and broader sense than that to which most of us are accustomed.

To relinquish a cherished way of doing something because of expert opinion may, curiously enough, represent either great maturity or great immaturity. The age group with which we deal seldom exhibits either extreme. They are in some ways mature and quite immature in others. We are dealing with individuals who are part adult and part adolescent. The growth stage of these boys has important implications for the coaching relationship.

Let me oversimplify one dimension of growth - that dimension that relates to a boy's relationships with adults and authoritarian demands. Much of what we learn early in life is accepted uncritically. For example, when we are first exposed to such matters as moral values, the English language or the multiplication table, we usually don't quarrel with them. At a later stage - let us say the high school one - the boy may truly feel that he's getting "the word" from his high school coach. Possibly he may never again listen to and react to coaching instruction with such intensity.

The process of maturing and acquiring an adult identity seems to require some sort of a rebellion against adult values with an eventual reconciliation, a reconciliation that may have quite a different basis. During this critical part of the growth process, a boy may have some difficulty in learning things taught to him by an adult. There seems to be considerable variation in this reaction with respect to intensity, smoothness, age of onset, and duration. In some cases it may be so smooth as to be scarcely observable; in others it might be so rough and abrupt as to produce marked emotional disturbance and great resistance to learning.

Suppose we get down to specifics and see how the pattern that has been outlined may be manifested on the athletic field.

I don't think any of us would maintain that technique-wise we deal in staggering intellectual concepts. The notions of "keeping off the pole" or "letting the hammer hang" shouldn't really be a challenge to a boy's intelligence. Yet, in many instances we find great resistance to the learning of such concepts. Often the boy "just doesn't seem to understand". He may even say this. At other times, you, as a coach, have the sensation of talking to a blank wall. You may explain, illustrate, demonstrate, and perhaps even plead, and yet the old pattern persists. It can be a frustrating business for you, particularly when you are sure that a slight change in form would improve performance. When there is failure to grasp concepts that are not challenging to the intellect and when there is an inability to perform a pattern that does not challenge coordination, logically we are forced to posit a blocking or resistance.

Such resistance may take other forms. There may be avoidance - in which the boy prefers for a time to work alone. He may "tie up" or become surly when the coach appears.

He may express "theories" when on the basis of his short exposure to an event a sound theory can hardly be forthcoming.

The boy may claim as his own discovery something that the coach had previously taught him. Countless times over a long period the coach may have emphasized a particular point of form only to have the boy come to him and say, "Coach, I've discovered something". He then proceeds to specify the identical point the coach has been emphasizing. He may even end up with the mild reprimand of, "I wish you'd told me about this, Coach".

The athlete may constantly confront his coach with points of form he has learned from his competitors, other coaches, and articles in the athletic journals. This, of course, is one way of telling the coach that he, the coach, is inadequate.

He may carp about the coach to his team-mates, saying "Oh so-and-so is a good enough Joe, but he doesn't understand the pole-vault". Or, he may express himself in more aggressive terms.

There are many other ways in which hostility and resistance can be shown. On a more aggressive level, the athlete may criticize the coach's instructions publicly - perhaps even on the floor of Madison Square Garden before the coach's colleagues. At times, an athlete will try to begin a theoretical discussion on his event with the hope of showing up the coach.

The area of athletic injuries is a highly complex one. Such injuries can often have wide psychological implications. However, it is interesting to speculate on what the real message may be that the chronic complainer is bringing to the coach. It may well be, "Look, I'm not going to do anything for you". The unsympathetic coach who ignores the boy's complaint may prevent the release of a good performance.

The patterns cited above illustrate some of the ways in which a boy's natural hostility may be drained off. There is a strong suggestion that in many instances, if it isn't drained off in some fashion, the interference with the coaching effort will be direct. The individual who is always polite, well-behaved and constantly calls you "Sir" may seem easy to live with but he may never really accept any coaching instruction.

Some of the reactions I have cited may be quite unpleasant for the coach. The coach's ego is naturally involved in his job and in the knowledge that he possesses. Most of us have a need to play the part of "beloved and respected mentor" - the man who knows what he is talking about and is listened to respectfully. But, living with these reactions on the part of the athletes and subjecting the ego to possible bruises seems to be part of the job. In a real sense, though, there is nothing personal in the "unfair" behavior of the boys. It appears simply to be the way people grow up, at least in our culture. I don't think that the coach who wants to be helpful can indulge his own emotions and respond with indignation and rage. Instead, with the realization that such patterns are all in the day's work he must maintain a professional attitude. He really has no more reason to be defensive than the psychiatrist who is faced with an unpleasant transference reaction on the part of a patient. How well a coach can maintain a professional attitude when confronted by "resistance" behavior by an athlete will probably depend not only upon his understanding of the roots of that behavior, but also upon his own maturity, personal security, and, unavoidably I feel, upon his technical competence. A coach who really believes he knows what he's talking about will feel less threatened.

Even with scientific advances, skill at human relations remains primarily an art. Certainly, no comprehensive formula can be given for dealing with post-adolescent hostility toward authority. Yet, some understanding of it and the maintaining of a professional attitude should be helpful. The boy's relationship to his coach is usually a special one. Because the athlete's relationship with his coach is often the closest he has with the official university family, the coach is in a special position to make a great contribution to the boy's growth, thereby playing a vital role in the educational system. Though adequate research on this point is lacking, there is reason to believe that the skilled and dedicated coach may, through his relationship with the athlete, facilitate a fuller and more rewarding academic effort.

As I've indicated, this critical growth reaction has at least several dimensions. I refer now to its smoothness and age of onset. Fortunately for the nerves of the coach, adjustments are sometimes made smoothly. All athletic squads may have good sized groups who go about the job of training and competing without requiring special attention or without being disturbing personnel problems. At the other extreme, some boys will fix a neurotic transference pattern on the coach and there may be nothing that can be done. In such cases the boy enters school as a personnel problem and either quits the squad or remains a personnel problem for four years. Even a skilled psychiatrist may be able to do little for him within the university setting.

Age of onset appears to be an interesting variable. I am sure all of you can recall boys whom you would have pronounced "uncoachables" during their freshman years. In later years some of them became much easier to work with; others may even have become pleasant to coach. On the other hand you will also recall boys who, though as freshman seemed completely cooperative and responsive to coaching, became, as seniors, just a bit more difficult to reach. They may have seemed to listen just as intensively as before, but somehow they did not quite respond to the coaching.

By senior year the former personnel hornet may be considerably ahead in growth of his teammate who once seemed so easy to live with. The latter might be just embarking on a period of turmoil. If we keep in mind that the college period is one of growth, we might be a little slower to place deprecatory labels on a boy or to rejoice that we have found a highly cooperative and responsive athlete.

At this point, I might say that I trust the impression has not been created that athletes must be overindulged and pampered. A coach cannot permit an athlete to "get away" with anything he wants simply because it makes him feel good. Perhaps the very essence of a boy's growing-up is that he make his adjustment to reality and the sometimes harsh rules of life. But a rigid, non-understanding approach on the part of the coach will not facilitate this adjustment.

The many topics, hypotheses, and tentative interpretations uncovered by the seminars cannot, of course, be fully discussed in this session. However, I would like to indicate a few that you might find interesting.

In general, our group has tended to view achievement and competitive ability as an expression of aggression. We have been increasingly curious concerning the conditions under which achievement can take

place or, put in other words, the conditions under which aggression can be expressed most freely. More and more it has come to our attention that individual sports create a psychological climate for achievement different from that of the team sports. The athlete who can do well as a member of a team may do poorly in an individual event. Obviously, track is made up of individual events, yet all of you have undoubtedly had men who could run a good leg on the relay team but who could not run well in an individual race.

A pattern that is sometimes difficult to perceive is that which seems to be caused by a counter-phobic reaction. Typically in such a case, the athlete works hard, seems to learn easily and makes rapid progress up to a certain point. Almost all at once, even though the training effort remains, progress is halted. Technical errors that once seemed so easy to eliminate now become tenacious and tantalizing. The coach and athlete usually make a determined effort to restore good form. Often, slow motion pictures are taken. Yet, the technical approach avails nothing. Apparently, the athlete has simply had all the achievement he can take.

In the case of failure to progress cited above the athlete continues to work hard and to maintain his training routine. More familiar to us, I think, is the case in which lack of progress is accompanied by apparent disinterest and diminishing of the training effort. Here, the slackening-off is more gradual than in the pattern of counter-phobic reaction. So common is the patter that the word "senioritis" has been coined to designate it. All we can usually be sure of in such instances is that the original drive, need or interest that impelled a boy toward athletic achievement has now decreased. The patterns appear to be homogeneous, but each individual case may represent the operation of a number of different factors. For example, "senioritis" may result from the satisfaction of a need, a new channeling of need satisfactions, peer pressures, etc.

The folklore of athletics, particularly track, contains countless tales of athletes who have made outstanding performances under such handicaps as injuries, hardships and the violation of training rules. Such anecdotes offer a clue to the phenomenon of the athlete who cannot accept a clear field. Common even among the very best performers are those athletes who cannot do well unless they are able to promulgate the word that they have an injury that requires taping or massage, that they are weak, or else that they have been out on the town the night before competition.

Competitive ability. A pattern of great interest to us has been the differential reactions of athletes to competitive stress. The terms "good" and "poor" competitor are very familiar to you. If, for example, you coach two shot-putters who do forty-five feet in practice, one may drop to forty-two feet in competition and the other rise to forty-eight feet. Probably all of you have coached high-jumpers who can make 6' 3" on Wednesday and miss six feet on Saturday. Too, you have probably worked with jumpers who could scarcely clear any height in mid-week and yet could perform well in competition. I think you will agree that these patterns tend to be quite stable.

From the reports that we have gathered concerning the failure to compete well, we have reason to believe that the phenomenon's roots are deep and strong. Apparently, there has been very little systematic investigation of competitive ability; there is only a small body of literature on the topic. Freud[1], when he writes of "Those who are wrecked by success", seems to be dealing with a similar pattern. Ernest Jones[2] has analyzed the "curious case of Paul Morphy".

Morphy, at an early age, became perhaps the greatest chess player of all time. Later, he gave up the game and eventually developed a psychosis. Because of his personality structure, Jones believed that Morphy could stand outstanding success only if the following three conditions were maintained: (a) activity had to be perceived as appropriate for adults, (b) it had to be conducted under pleasant conditions, and (c) motives had to be pure and admirable. Jones traces the violation of all three conditions, and he believes they caused withdrawal from the game and subsequent psychotic breakdown.

Both Freud and Jones relate inability to stand success to the resolution of the oedipal situation-i.e., the early family constellation, particularly competition with the father.

A body of principles does exist which would seem to have implications for the ability to compete. However, an important step is to examine the pattern and this we have been trying to do. Our preliminary findings suggested that "poor" and "good" competitors do exhibit differential aspects of behavior. It seemed in order, therefore, to validate these findings against observations of a good number of experienced coaches. Since the highly quantitative nature of track permits ready identification of competitive ability, track coaches became the natural choice. Hence, a questionnaire was formulated, which many of you received.

1. Freud, Sigmund Collected Papers, Vol. IV, New York, London, Hogarth Press, 1925.
2. Jones, Ernest Essays in Applied Psycho-analysis, London, Hogarth Press, 1951.

I would like to take a moment to thank you for your magnificent cooperation. Sixty-five questionnaires were mailed. All but three were returned. In all, there were 57 usable questionnaires on the "good" competitor and 60 on the "poor". Further, about half the respondents wrote personal letters expressing their views. Almost everyone expressed interest in and enthusiasm for the project. As you can see, the response was more than gratifying.

I mention that the questionnaire was essentially an attempt to validate a portion of our tentative findings. Of course, there was the limitation that questions had to be confined to behavior that was readily observable to the coach.

Each participating coach received two questionnaires-one to apply to a "good" competitor and the other to a "poor" competitor. Directions were as follows.

GOOD COMPETITOR

By checking the appropriate box, please answer the below questions about the best competitors you have ever coached. The man you consider for these questions need not be a member of the squad. He can be anyone who generally seems or seemed to rise above his practice performance in competition. We won't need his name. If the responses listed for a question are not adequate, please write in the appropriate answer. Use the reverse side if necessary.

POOR COMPETITOR

By checking the appropriate box, please answer the below questions about the worst or one of the worst competitors you have ever coached. The man you consider for these questions need not be a present member of the squad. He can be anyone who generally seems or seemed to blow up or go to pieces in competition-i.e., not be able to approach his practice performance. We won't need his name. If the responses listed for a question are not adequate, please write in the appropriate answer. Use the reverse side if necessary.

The questionnaire consisted of 14 items. The first of the items simply asked for the subject's event; the remaining thirteen were behavioral and personality items. Comparisons between the responses assigned to "good" competitors were made between those given to the "poor" by means of the chi-square technique. Twelve of the 13 items were found to be significant at better than the .01 level.

Item 2. What time of the day does he (or did he) usually come to practice?

	Good	Poor
Earlier in the day than most men	11	12
About the same time as most	43	38
Later than most	3	6
Other	0	4

This item is the only behavioral one that failed to produce a statistically significant difference. Our preliminary findings had indicated that the "poor" competitor has a tendency to practice at odd hours and to avoid the regular work-out routine. Too, we seemed to find that the athlete could operate in such a subtle fashion that often a coach is not immediately aware of the pattern. I, myself, tend to regard this behavior as an attempt to avoid the coach and as an indication of a poor coach-athlete relationship.

As you can see, there is only a slight tendency for the "poors" to show less conformity in their work-out patterns. However, a single question is probably not adequate for the exploration of this behavior. It is interesting to note that four coaches were unable to categorize the work-out behavior of their "poor" competitors.

Item 3. Does he work hard in practice?

	Good	Poor
Lazy - needs to be pushed	1	5
About average	4	19

Hard Worker	50	32
Other	2	2

It seemed important to establish that the "poor" competitors are committed to the activity in some way - i.e., that their poor performances are not a result of indifference. The "good" competitors were considered harder workers, but only six subjects, one "good" and five "poor", were labeled lazy. A "halo" effect may be reflected, yet, obviously, such an effect was not completely rampant.

Item 4. When he talks about future performance, is he shooting for

	Good	Poor
The next meet?	40	23
Late season?	2	3
Some eventual performance?	10	28
Other?	5	6

This result is in agreement with our earlier findings. The full implications are not known, but some avoidance of athletic achievement is indicated. Possibly, the "poor" competitor can take achievement when it does not seem imminent.

Item 5. After a poor competitive showing, does he blame

	Good	Poor
Conditions, officials, etc.?	2	10
Himself?	44	38
Both?	1	10
Other?	10	2

Our expectation was reversed. Both our preliminary findings and some data from another area of achievement had indicated that the "good" competitor might be extrapunitive - i.e., he might have a tendency to blame others for his poor performances. Conversely, there was an expectation that the "poor" competitor would show intrapunitive behavior. The results were probably affected somewhat by the sizable group of "goods" in the "other" category who were reported never to have had a poor competitive showing.

Items six through nine represent, as do the other items, an attempt to validate an empirical pattern. Yet, they do seem to have the flavor of an "adjustment inventory". Certainly, the "poor" competitor would appear to be unhappier, more constricted and, in general, more poorly adjusted. The "poor" competitor seems to have difficulty expressing his aggression generally, and his inability to compete in athletics may be a specific instance of such an overall difficulty.

Since there is an expectation that the inadequate competitor has an ambivalence of motivation, there is a theoretical expectation that he would show greater personal conflict.

Item 6. Is he considered

	Good	Poor
A lone wolf?	1	18
Very friendly?	42	12
About average?	13	28
Other?	1	2

Item 7. Does he seem to be happy?

Usually in good spirits, has plenty of belly laughs	31	16
Smiles easily, but seldom laughs heartily	24	29

	Good	Poor
Seldom smiles or laughs	1	15
Other	1	0
Item 8. Does he tend to be		
The life of the party?	15	9
About average?	35	25
Very quiet?	7	21
Other?	0	5
Item 9. Does he make sense in his conversation?		
Always rational and coherent	46	15
About average	10	32
Conversation sometimes seems strange and hard to follow	1	12
Other?	1	1

The next three items, ten through twelve, deal with the coach-athlete relationship and learning.

Item 10. Does he follow coaching instruction well?

	Good	Poor
Usually follows instructions well without comment	43	19
Follows instructions well but often with comment	14	16
Usually makes out a case for doing something different	0	21
Other?	0	4

The differential reaction to coaching instruction may represent the operation of a number of factors. There is, of course, theoretical reason to expect a negative reaction to authority and adults on the part of the "poor" competitors. In addition, our preliminary findings had suggested that the "poor" competitor prefers to structure his workouts in such a way as to preclude real achievement. In other words, a fear may exist that the instructions given by the coach may bring about success.

Item 11. Does he learn easily?

Learns well	47	13
An average learner	8	31
Has great difficulty in learning some things	2	14
Other?	0	2

In the particular context where learning takes place, i.e., the coach-athlete relationship, as we would expect, there appears to be greater emotional blocking on the part of the "poor" competitors.

Item 12. Does he talk easily?

Communication good	48	23
About average	9	23
Difficult to talk to	0	13
Other	0	1

This result confirms our empirical findings that the "poor" competitor communicates more poorly with adults. This lesser ability to communicate may represent both a difference in attitude toward adults and a more general inability to handle aggression.

Item 13. Is he popular with his team-mates?

	Good	Poor
Well liked	48	14
About average	7	30
Unpopular	1	15
Other?	1	1

It is not surprising that the "poor" competitor, because he tends to be a more introverted, less friendly "lone wolf", should suffer poorer peer relationships. Yet, the great popularity of the "good" competitors is a bit surprising in view of the belief that outstanding achievement is somewhat in violation of the mores of the age group.

Item 14. What is his reaction following a good competitive performance?

	Good	Poor
Likely to make another good performance the following week	51	0
Likely to make an average performance the following week	4	21
Likely to fall off badly in the next meet	1	29
Other	1	10

This result may have rather staggering implications for our views on learning and our coaching procedure. American education has been dominated by Thorndike's principle of the "law of effect". Coaches' views have been indicated by such expressions as: "He'll be alright after he gets a performance under his belt"; "As soon as he'tastes a little blood', he'll have a desire to win"; "Nothing breeds success like success", etc. Apparently, a taste of success does anything but reassure a "poor" competitor. Whatever anxieties or other interferences with good performance may exist, apparently these are stronger following some success.

The pattern of differential reaction to stress requires considerably more research. More theoretical specification is needed. Particularly, efforts should be made to explore the possible appropriateness of present psychological models. Perhaps some "depth" studies would be helpful. Yet, our present results do, I think, offer some provocative correlations. They tend to destroy a stereotype and to offer tentative portraits. The "good" competitor is not the tight-lipped, uncommunicative lone wolf. The "good" competitor tends to be more conflict free, less constricted, and better adjusted; in general, he is freer to express his aggression.

Parenthetically, I must confess that I have made the obvious speculations concerning the implications of this pattern, a pattern that our highly quantitative sport permits us to see so clearly, for other fields such as industry and the military. Is the differential reaction to stress in athletics related to the breakdown of individuals in industry? Is it related to the failure of a high percentage of riflemen to fire in combat?

It has been a pleasure to invite your attention to this important area. Your comments and other reactions will be most welcome. I would suggest that a growing interest on the part of coaches in the area of athletic behavior may bring us useful coaching insights and also permit us to contribute to the systematic study of behavior.

SOME PHYSIOLOGICAL ASPECTS OF ATHLETIC RECORD PERFORMANCES

Dr. Ernst Jokl, University of Kentucky

The first issue which I wish to discuss to-night is the acceleration of growth. Form and function of human life have been changing for many centuries. People today live three and a half times as long as they did in the Bronze and Early Stone Age, and twice as long as in the Middle Ages. Swedish figures show that the number of life births per 1000 has sharply decreased during the past three centuries but that this decrease has been paralleled by such a decline in the rate of infant and general mortality that the Swedish population has trebled in size at the same time.

During the past half century the process of prolongation of life has received an added impetus. Furthermore, children today grow more quickly, they maturate earlier and attain a much superior physique compared with previous generations. A medium sized American University student of today does not fit into the armor of a medieval knight. Menarch in girls occurs four years earlier than in 1875. Newly born children are heavier and longer than their parents were at birth. First dentition takes place earlier; five year old boys and girls are taller and heavier than seven year old ones were fifty years ago. Sizes of hats, dresses, suits and shoes worn by young adults nowadays are bigger than those worn by their elders. This process of acceleration has not ended and further advances are to be expected.

The acceleration of growth represents the one major biological force behind the enormous improvements of athletic performances that have taken place during the past fifty years. Since this acceleration continues and will continue for some time to come it is certain that on this account alone further advancements of track and field performances will take place.

The second issue I should like to deal with is that of the deceleration of aging. The period of life during which a man today is capable of performing on his optimal level of physical efficiency is prolonged. During the past twenty-five years or so, a steadily increasing number of competitors above 30 and 40 and even 50 have played a prominent part in different athletic contests. Some kinds of sporting activities are more amenable to prolonged participation for middle aged athletes such as long distance running - you remember the marathon victory in 1928 by the 42 year old Finn Steenros; fencing - you remember the prominent part played by the Hungarian Mrs. Preiss, who won the 1936 Olympic Games and who was placed 2nd 16 years later in Helsinki; you remember the 42 year old German gymnastic champion Schwarzmann who obtained a gold medal in 1936 and a silver medal in 1952; you remember that a few weeks ago the 54 year old French tennis ace Cochet won the international tournament in Tangier. These examples characterize the remarkable shift which has accompanied the increase of the life span of our generation and which will be more pronounced in the future.

A third issue pertains to the fact that physical training very much alters the growth process in that it leads to earlier maturation, and to a retardation of senescence, respectively. The growing youth who participates in athletic training attains an optimal growth pattern earlier than would have been the case if he had remained inactive. The aging process will be inhibited in all its manifestations if a well trained person maintains his fitness through training throughout life. At the time of his decathlon triumph in London in 1948 the 17 year old Mathias was an adult man, certainly not an overgrown school boy; and middle aged champions like Cochet and Schwarzmann and Steenros did not show the decline in physique, the decline in efficiency and the decline in health which is in evidence in the majority of men of their age.

But the Olympic champion who discontinues his training undergoes a process of physical deterioration irrespective of his age. We say he "is losing form", and this popular term expresses a significant facet of truth. Dr. Cureton has adduced evidence to the effect that the Olympic champion who gives up training quickly loses in efficiency; in fact, after a few months he may be as inefficient as anybody who has never indulged in sport at all.

It is a remarkable and unexpected discovery which has been made recently that the inhibition of aging through physical training, or the acceleration of aging that goes with the discontinuation of training in hitherto active athletes are connected with the inhibition or premature appearance respectively of the degenerative diseases, especially of arteriosclerosis. This discovery came unexpectedly because the old belief that physical training affords protection from illness is not correct, so far as the infectious diseases are concerned. And until recently, until the introduction of the sulfa drugs in 1936 and penicillin in 1940 and the other marvellous antibiotic medicines, since then the infectious diseases were the most important causes of illness during the first three decades of life. This latter question had just been settled by statistical and experimental and clinical evidence in that it was proved beyond doubt that physical training does not give immunity towards infectious diseases and that therefore the medical and epidemiological management of athletes must be the same as that of non-athletes; and now we find that the situation is quite different with the degenerative diseases.

In a study on 2000 participants aged 40 - 84 at the Annual National Gymnastic Festival in Germany in 1952 in Marburg, I noted that these men and women who throughout their lives had kept themselves in training, who at 40 and 50 and 60 and 70 and even at 80 were good enough to compete in an exercise contest demanding considerable motor skill, spirit and enterprise, that these men and women were free of coronary occlusion and arteriosclerosis and kidney disease and enlarged prostate glands and cancer; that they looked young; and that in terms of physical efficiency they were superior to untrained men and women half their ages. It can of course be argued that these old gymnasts simply had been spared the devastations of senility and that their physical efficiency was the effect and not the cause of their remarkable fitness. But this explanation is not acceptable for a number of reasons, one of them being that superior physique and first class muscular efficiency simply is not seen as a group characteristic in physically untrained men and women of over 50 and 60 and 70 and even 80, and the observation that the old gymnasts were free from the degenerative diseases therefore seems to be associated with the fact that they have undergone life-long physical training.

A comparison of athletic performances of participants in the Marburg Games in 1952 with those of participants in corresponding competitions 25 years earlier in Cologne revealed that the 40 and 50 year old gymnasts of 1952 performed significantly better than did the 40 and 50 year old gymnasts in 1928. The acceleration of growth which can be shown in young people during the past 25 years or so is paralleled by a deceleration of aging of which the improvement in the physical efficiency of the old gymnasts is a significant example.

A third issue has been clarified as a result of comprehensive researches conducted during the past few years by the various expert divisions of the United Nations, particularly the World Health Organization, the Food and Agricultural Organization and the Demographic Committee in Geneva. For some time it had been known that children of poorer homes grow less rapidly and attain lesser standards of development than children of well-to-do homes. Similarly, morbidity, mortality and longevity statistics reveal a differentiation between rich and poor. These world wide studies have shown that the economic stratification of various geographical regions of the world is manifested in statistical averages of growth, efficiency and health of their populations. A group survey of physical development, health and economic background of soldiers from New Zealand and from India during World War II yielded significant data. The New Zealand soldiers weighed 30 lbs. more, were 13 cm. taller and had a life expectancy of 28 more years as compared with the Indians. Respective mortality rates were 9.2 and 21.8 per 1,000; incidence of tuberculosis 39 and 232 per 100,000; infant mortality 31 and 167 per 1,000. The diet of the New Zealanders contained 3,600 calories as against less than 2,000 for the Indian diet. The New Zealanders ate ample dairy products, meat, fish, fresh vegetables and fruit while the Indians lived almost exclusively on starch.

Improvements in nutrition and the enormous expansion in knowledge of prevention and treatment of the infectious diseases are the two main causes of the acceleration of growth in Europe and in the United States and in such other parts of the world in which similar developments have taken place. Length of life, nutrition, growth and morbidity are largely determined by social conditions, and the latter in turn by social ideas. Under favorable environmental circumstances previously restrained forces are released for education and art, for moral advancement and for an increase in the scope of human freedom.

We must not blind ourselves to the fact that in Eastern Europe, in Russia, in India, in China and indeed in the entire Asian continent such forces are being released at present. This release of forces has a profound effect upon the development of athletics.

An appropriate example of the issue under review is that of the part played by the black races in athletics. The 150 million black people in Africa, the 150 million black people in the Pacific area, in spite of their excellent aptitude for sport have until recently made little if any contribution to top level athletics. Malnutrition and epidemic diseases, ignorance and cultural retardation have held them back. But the less than 10% of our colored co-citizens, and the numerically small negro communities of British Jamaica and Trinidad have played a noteworthy role in international sports. The choice of Mal Whitfield as recipient of the James E. Sullivan Memorial Trophy for 1954 is not only a fitting tribute to a great sportsman but also a tribute to the best traditions of American liberalism and decency which have made possible the advancement of the colored people in the United States as is exemplified by their marvelous track and field successes. The same tribute is due to the progressive policy of the British Colonial Office which is responsible for the remarkable social and physical development of millions of black citizens of the Empire, a development which very soon will yield striking results in the field of athletics in Africa, especially in the Gold Coast, Nigeria, Uganda, Kenya, Tanganyika and the Federated States of Southern Rhodesia, Northern Rhodesia and Nyassaland.

So far, I have spoken of physiological phenomena of growth which have a collective significance.

Growth itself is driven by inherent forces. The factors which make for acceleration of development, and for inhibition of aging also are of a collective nature.

Notwithstanding the impersonal basis for all outstanding athletic performances; notwithstanding the fact that none of you would have much hope of producing first class track and field performers today in Equatorial Africa or on Celebes in the Pacific Ocean; it is nevertheless true that top level performances in track and field athletics are invariably individual achievements. A champion must have a superior natural endowment to start with but he must also undergo a course of training which incorporates the intelligent application of the lessons of athletic tradition, scientific judgement and imaginative planning.

As an example I shall present to you in the last few minutes that are left for me certain data from a recently completed medical study of marathon runners. I shall confine myself to mentioning two points. The one is that contrary to what many of you may think, everybody can learn to run the marathon distance. Not that I wish to recommend marathon running as a routine training procedure. But the variety of physiques and of most physiological functions that were tested during the marathon race was so great that this surprising conclusion cannot be doubted. The one feature all marathon runners had in common was their peculiar attachment to long distance running, the steadfastness with which they train over prolonged periods and the profound satisfaction which they draw from their strenuous sport. But when it came to the study of the best marathon runners as against the average or slowest performers, an entirely different picture emerged. As far as the kind of physical endurance is concerned which a good marathon runner is bound to display, he must be endowed with a superior heart and with superior oxygen intake capacity. Before he starts training he must possess something extra which we physiologists now are able to define. I can tell you who among a group of 1000 men will have a chance; on account of laboratory and clinical tests I can choose out of the 1000 men 50 among which you will find your champion. It is this kind of testing program which the Russians are now carrying out on a large scale as we were told at the medical conference on sports-medicine in Helsinki in 1952.

Of course, even the most gifted athlete must be prepared to train. He must have the desire to do so, he must have the powerful drive and interest and devotion without which the strenuous training that is demanded from him would be senseless or worse. I am not going to deal tonight with the kind of training which will make a Zatopek or a Chataway. You know very well that the time when a marathon runner could rely on his endurance to win has passed. I do not think that anybody who is unable to run the 100 m under 12 seconds has any hope of being among the first 10 at any future Olympic Marathon. To be able to run the 100 m in 11.6 and to trot along comfortably for three hours are prerequisites without which I would advise nobody to take up training for the Olympic marathon. You know, I am sure, how the great English and American and Czech and Russian long distance runners have trained, of the need for endless sprints and quarter mile races, for weight lifting, but also for clinical check-ups so as to exclude hidden handicaps like an infected tooth or sinusitis which may critically reduce the athlete's efficiency.

This then, is the broad picture which I have tried to draw to-night, a picture composed of a variety of research results that allow us to envisage considerable developments in coaching.

There is the fascinating background development affecting the substrata to which we and the society of which we form a part belong; a development triggered off by advancements of knowledge, which has improved the standards of living of the people of our country; a development resulting from better nutrition, and from better health; a development reflecting progress of social concepts and of moral responsibilities of man in his attitude towards his neighbor. It is thus that the acceleration of growth and the deceleration of aging of which I have spoken have been brought about. These highly significant processes have changed and continue to change the character of our time, just as much as the revolution in physics and technology have changed and continue to change it.

But the second set of physiological data to which I have referred are of equal importance. They pertain to our ability, brought about by scientific advancements, by medical experimentation, clinical observation, statistical analysis and application of physics, to ascertain the aptitude of young men and women for athletics. Though I have mentioned to you specifically only the results of the study on marathon running, corresponding selections can be made in respect to other athletic specialties. It is this kind of scientific aptitude analyses to which we track coaches must take recourse in the future if we wish to retain our supremacy in international contests. The very fact that during the past four years or so Russia has gone a long way along the road which I have indicated should not be forgotten by us. It seems to me that this assembly of the nation's leading experts on track coaching should formulate its policy in this field which, as I like to put it, has been entrusted to us for safe keeping. I propose the establishment of a National Research Center for Aptitude Testing for Athletics with the active support of this distinguished association.

As to the evolution of motor techniques for track and field events, every coach ought to realize that

entirely new opportunities are created for us by the medical and social and psychological developments to which I have referred tonight. None of the techniques of track and field athletics as we know them today are final. They all are capable of general improvements as well as of adaptation to the abilities of individual athletes. It is the prerogative of Man over animals that his central nervous system is "plastic", that it can perfect an unending variety of original movements in accordance with human concepts and thoughts. The great British neurologist Sir Charles Sherrington has said that Man can materialize concepts and thoughts in movements. The sculptor, the painter, the musician and the craftsman have at all times been recognized for their special gift in this respect. I think that the track coach deserves a place among this illustrious community of artists and teachers.

You, the track coaches, have made a singular contribution to physiology by providing empirical information on the nature and scope of training. Those of us who like myself have the good fortune to have been track athletes and to be track coaches and physicians themselves know that theory alone cannot produce a first class runner or jumper or thrower. It is, I think, a privilege which you have conferred through me upon the medical profession that you have asked me to address you to-night. I hope that from this meeting further cooperation will spring up between your profession and those among us medical men who love sport to the benefit of our youth and to the advancement of this great nation.

CLINIC NOTES

The Summer Track and Field Clinic of the NCTCA was held at the University of Southern California, the first meeting on Thursday, June 16. The meeting was called to order by Chairman Payton Jordan at 9:25 A.M. Chairman Jordan prefaced his opening remarks with a few announcements, telling the coaches where to pick up their credentials and announcing the luncheon for Big 10 personnel. After a short formal greeting to those present, he proceded to introduce the first speaker.

"It is with a great deal of pleasure that I at this time present to you a colleague of mine, one of the top men in the field of Psychology, Dr. David Cole, the chairman of our Psychology Department. He did his doctoral work on "The Social Psychology of Leadership", which, in my opinion, ties in very closely with the topic on which he is to speak today, "Motivation and Performance". I will not say more except to say that he is a man with a great deal of interest in our particular sport of Track and Field, one who has done a wonderful job with the athlete as well as the student in psychology, a man who understands young and old alike, and one, I feel, who can do a great deal of good in presenting to us his thoughts and ideas on "Motivation and Performance". Dr. David Cole.

MOTIVATION AND PERFORMANCE

Dr. David Cole, Occidental College

Thank you. I shall very appropriately time myself with a stopwatch and try to put you back somewhat closer to schedule. My favorite definition of a psychologist is this: A psychologist is a man, who, when a pretty girl enters the room, watches the other people. By this criterion, I have never felt too much like a psychologist. I will, however, confess to a very real interest in Track and Field and one which has grown out primarily since I have been at Occidental College. I came to the College to join the faculty. I had seen a few track meets and had watched them with about the same intelligence a cow would. We had a student in the Department of Psychology who was a reformed miler, by which I mean that he was not a miler any more, but he took me out to see a meet and showed me what to watch - what was really going on. Since then, my wife and I have been very ardent track fans and in the spring ordinarily never leave the house without a stopwatch.

Appearing before you today, I bring you the conviction that those of us who are in the academic quarter, teaching in the classroom, face a great many of the same problems that those of you do who do the major part of your teaching on the athletic field. In the classroom, too, we have people who somehow seem never to live up to the abilities that we think they have. We have our students who are afraid to achieve. We have our students who are unwilling to work harder to achieve what they might achieve. We have our students who rely too heavily on a good kick at the finish - don't pace themselves very well across the whole course of work that we have laid out for them. Then we have our students too who surprise us with the extent to which they do come through, often above the level of expectation that we held for them. So, I think when it comes to talking about "Motivation" and "Performance", there are a number of things which can be said which are applicable to your major problems and to my own.

Now, the fact that competition enhances the level of motivation and the level of performance is so well known as to need very little demonstration. I have observed in the laboratory this situation where you bring a student in and hook him up to a gadget called an "ergagraph", which consists of a ring which is put on his index finger with a weight attached to the string on the other end of the ring. His problem is to contract the finger and lift the weight, then release the finger and contract it again and keep this up until he simply can not lift it any more. You can attach this device to a turnagraph (?), a smoked paper chart to get a recording of the work he does and to get a measure of the work output of the individual. If you encourage him and he properly cooperates on the subject, he will, in fact, work until he physically is unable to go on. I have watched them, either by being in the room or through a one-way screen and this man finally ends up with his head down on the table, completely exhausted, with the only sign of life the twitching of his index finger. Well, they have reached, as far as they are concerned, the physical limits and they absolutely can do no more work. They are allowed to rest up a day or so and then are brought in another day with the same kind of set-up, except that this time you put two men into a room, with two ergagraphs and two turnagraphs, so that not only are they trying to do all the work they possibly can, but they are doing it in competition with someone else. You find that almost inevitably they will

brilliantly exceed the performance of the day before, not because of the practice they have had, but because of the fact that they are now competing with another individual. You find throughout various areas that we investigate, that the limits that are experienced as physical are very often actually psychological. In fact, today we are far short of knowing what the actual limits of the human being in terms of strength and endurance may actually be. In one study done in industry a group of workers were taken who had had a stable rate of production for five years and it had been supposed they were working at their physical maximum, that is, in terms of what they could put out over long periods of time. Changes were made to increase the motivation of these workers; their production went up and stayed up. As far as we know, we have not yet reached the limit of human capacity in any endeavor. The day may come when physiologists and biologists will be able to tell us what the limits for a human individual under given conditions are. We may reach the day when we give to the scientist the measure of physical capacity - the physical structure, rather - of the individual and tell the scientist under what atmospheric conditions and so on the person will operate, and he will be able to tell us, "Here is the maximum which you may expect". But so far we do not have that information and so far all the evidences suggest that most of our barriers are not physical at all, but psychological.

One bit of evidence of this nature comes from the field of Abnormal Psychology. You find that persons under hypnosis, or certain types of mental patients, because of the particular circumstances of their situation, have very different motivations from what one would deem a normal personnel. And under these conditions of either hypnotic suggestions or certain delusional patterns you often find that they will exceed the limits, the presumed limits, of physical endurance and strength by a very great margin. I have seen, for example, a mental patient who, because of his delusion, thought it necessary for him to hold his head up off the bed as he lay down. Now you know yourself from exercise that this is a very fatiguing process, to lie down and hold your head right up off the bed or couch or whatever you are lying on for any length of time. The neck muscles get awfully tired. I don't know how long he had done this but he exceeded by hours and hours and hours what would normally be presumed to be the limit, the physical limit, of a human being in this regard. Now I am not suggesting that we hypnotize our athletes nor am I suggesting that we develop delusions in them but I am simply using it as an illustration that if we know how, over the years, to cap the motivations of the individual, to increase his desire to compete, his desire to win, that the limits still are far beyond what we have reached today.

With this in mind then, as a background, let me suggest a few factors which I think are important in the motivation of either the athlete or the student. Sometimes you find both in the same individual. I am going to suggest that motivation and morale are very closely connected, that those things which we can do to improve the morale of the individual or the group are very likely to increase the motivation of the individual involved and consequently raise the level of his performance. Now there are many factors which are important in morale. I shall simply point out a few here this morning. One of these is a matter of confidence in a leader. Any time a group, or an individual within a group, loses confidence in the leader, or in this case the teacher or coach, it is very detrimental to his morale and consequently probably to his motivation to achieve or try to achieve the goal set up for him by his coach or teacher.

Now there are certain exceptional aspects of this which I think we should be aware of as members of college faculties. One of these factors grows out of the problem of recruiting, recruiting the student, recruiting the athletes. We hear a great deal about proselyting, about attempting to attract desirable athletes to our campuses. We hear less about what also goes on in attempting to recruit all kinds of promising students to the college campuses. A youngster who graduated from high school earlier this month with all sorts of promise as a future chemist has been sought after by many, many schools just as the youngster is who graduated with promise in football or track. This leads to certain problems. Most schools today have very active recruiting programs for all types of students, desirable students. Most of them put out very attractive brochures trying to entice the student by beautiful pictures of the campus, pictures depicting the social life on the campus, with occassional subtle references to studies. The whole idea is "Come on, this is the place. This is it. You'll like our school, you'll love our life", and so on. Well, the result is that our young chemist-to-be, our young athlete-to-be, has perhaps chosen five or six very fine, very desirable schools. In the process of this recruiting, he is very likely to have been oversold. Our freshmen come in - I am speaking not just from observation of freshmen at Occidental but I have been on several different campuses and have had a chance to observe what goes on in different institutions of various sizes and in different localities. The freshmen come in with an abundance of enthusiasm, but oftentimes unrealistic enthusiasm. Our chemist comes into his chemistry department with the idea that here, absolutely, is all power. Here is the place where out of all possible chemistry departments in America, he is going to receive the finest training from men who are omnipotent and omniscient, with the absolute in laboratory equipment - everything is perfect. Or he comes

down to our athletic field. It's the same idea. He has been duped by alumni or others into thinking that this particular group of coaches will offer him the absolute perfection that he seeks, that here he will get the finest training possible. Well now, this is all right except it also happens that we are human beings. We on the college faculty perhaps have many things to offer the incoming student, but we are not perfect. We in the Psychology Department don't know all the answers in psychology. We don't know about all the phases in psychology just as in your field, you can't keep up with everything that's going on. You've got to limit yourself and eventually he comes to find out that you are not omnipotent, that you are not omniscient, that you, like most everybody else, are a fallible human being.

Now comes the problem of confidence in the leader. When our students have been perhaps grossly oversold, their immature concepts of college have allowed them to think that they are stepping into a setting where everything is going to be perfect - they are going to find the finest of everything - there often comes a rude awakening. I think our problem, wherever we operate on the college campus, whatever faculty position we hold, one of our problems is to help the student readjust - I think this often comes about in his sophomore year - readjust to a realistic appraisal of what we can offer so that we do not lose his confidence, so that he does not become cynical, so that he accepts the fact that we have much to offer and yet do not have to be perfect in the process of doing it. If we limp at this point, then his cynicism is apt to mount and boil over and pretty soon he will not pay attention to the good things we have to offer him as faculty members and teachers and coaches.

There is a second aspect to this confidence in the leader which I think is very pertinent to all of us and perhaps more so to those of you who are in coaching. I hope you will excuse me if I sound too much like a clinical psychologist for a moment, but I want to speak to you about the idea that we function as "father figures" for our athletes. This is nothing unusual, nothing abnormal, it is really not very difficult to imagine. Unless we were raised in very unusual family structures, all of us here in our early childhood had one or maybe two or three prominent male figures that determined for us what it was to be masculine, what it meant to be a male in American society. Our father, or a grandfather, uncle - one to three very important male figures gave us definition as to what manhood meant. As we grew out of childhood and moved into adolescence, it was a very natural tendency for us to generalize from this earlier learning. We meet new important male figures - teachers and coaches in particular - and we say, without realizing it perhaps, "Well, I know what these men are like because I've already learned about men. They are going to be like the other men that I've known". Now this creates no particular problem so long as our earlier relationships with these important male figures were good ones. If we had sound, stable relationships with our fathers and the other important men when we were youngsters, then we are ready to deal with other important men as we grow up. Where you and I, as teachers and coaches, get into trouble is where the relationships that our youngsters who are in our classes and on our teams had with their fathers were very unsatisfactory, because whether we like it or not, at this point we fall heir to all the tension, all the hostility, all the anxiety that the youngster earlier felt in connection with his father. Something like this usually goes on: the youngster comes to our campus. He has been, as I pointed out a moment ago, very often oversold on what a wonderful institution he is getting into and has idealized it beyond reality. To the consequence, we are talking here about the youngster who has had a rather poor relationship with his father, who had an unstable father who created many problems for him, as a result of this over-selling, he says as he looks at his teachers or as he looks at his coach, "Now, this is what father ought to have been". We start off not as his original father but as an ideal - "This is the perfect man that should have been in my life to help me grow up". And he looks upon us as God himself. Now as I pointed out, we must be making a mistake some time. We turn out not to be perfect. And here is where the backwash comes in; here is where the youngster, when he begins to see us as fallible, turns on us - without realizing it himself - turns on us and says, "Hmph, you're not what I thought you were, you're just like my no-good old man". And we now, as I said a moment ago, become the heir to all the hostilities, all of the tension, all of the anxieties this youngster may have felt earlier in reference to his father.

Now you say, this is all very fine but we are running an athletic program, not a clinic. What difference does all this make to me as a coach? What difference does it make to me as a teacher? I am not suggesting that we turn our curriculum or our athletic program into a sanitarium but I am suggesting that probably all of us want our youngsters to realize the potentialities that they really have. The fact that they are there on our squads, that they are there in our colleges, indicates that they do have plenty on the ball. But when they are so tied up in their relationships with us that they are afraid of us, that they are unconsciously angry toward us because of the feeling toward the father, then they cannot produce. I am not saying to anyone nor am I saying to any colleague of mine in the Psychology Department how he should handle this kind of situation. That depends on your own personality, on the framework in which you operate, on the facilities that are available, on the unique personality of the individual athlete. But at least I

am suggesting that if we can understand within ourselves what is going on, then we can base our decision on a realistic appraisal of the situation, we are no longer groping in the dark. And anytime when an athlete who at first has seemingly worshipped us, who has perhaps been over-compliant in taking every suggestion - you have seen this "flattery". You have seen the student who asks you a question and then is so anxious to please you and thinks you are so important that he starts to say "Yes, I understand, that's right" before you have even answered the question. You probably have had the same sort of experience with your athletes. Well, if we see this man then change to one who is surly, who is moody, who rejects our suggestions, who is erratic in whether he shows up for practice or not, at least if we think along the possible lines that now he is beginning to live out with us the problems he earlier faced with his father, then we can decide what we want to do about it. We won't feel lost in this situation. How to operate, how we want to handle it, becomes always an individual matter.

There is another factor in morale I would like to refer to here, this matter of a feeling of belonging, feeling a part of a group. I mentioned earlier what happened when you put two men together in competition with this gadget I called the "ergagraph". What I could also have said at that time but purposely, deliberately delayed until now, was that if you want to even further increase the motivation of the individual, the level of his performance, then you see not only that he is competing against some one, but that he is competing for some group or some larger intangible, something which makes it not just his effort, but the effort for the organization. Now we are used to thinking of some sports as "team" sports - football, basketball, - these are usually conceptualized as group activities and team spirit is made much of. On the other hand, we sometimes have been apt to think of Track and Field as an "individual" sport. I think when we do, we are missing a bet. I had the opportunity this year to watch one team - it was not Occidental. I have watched them too but I am going to use this other team as my illustration. This team had among its members a very outstanding athlete, a man of championship caliber. I was interested in watching him during this dual meet. Maybe this is where I become a psychologist and not just a spectator because I watched him to try to learn more about him as a person rather than just an athletic competitor. The thing that impressed me about this man was the keen interest he apparently showed in the team as a team. He had already competed in his event. He had won his event and had done a very outstanding job and it was quite likely that the papers the next day were going to proclaim his performance, yet all during the course of the meet I saw him talking to one athlete before he'd start a race, talking to a man after a race, tying a teammate's shoestring, and so on - just a constant interaction with his teammates. I couldn't help thinking how far this man had gone beyond the concept of track as an individual sport. It appeared that he had really developed a team spirit which had been motivating him all through the afternoon. The man in the Coliseum who comes down the last sixty or seventy yards towards the tape driven on by simply the desire to win for himself, is much more likely to give up than the man who is driving on because there is something outside of himself - call it Alma Mater, call it school spirit, consider it corny, if you wish - it nevertheless is real in the sense of affecting the individual, and he who is driven by that will probably be able to reach deeper into the reserves that he has, the physical reserves, than the individual who lacks it.

Now another important aspect of morale is the concept the individual has of the equipment, if you like, that he brings to college. I'm not going to talk here about physical equipment such as track shoes, and so on, though they play an important role, but rather the confidence the individual has in himself. One of the most important definitions that we gain in life is the definition of ourselves. We are not born with this self-concept at all; we are not born with any awareness of ourselves as a being, but we learn throughout our life that we are a certain kind of person and most of this learning takes place pretty early in life. The other day I was in a market doing some shopping. There was a little girl there, I expect she was about four or five, and she asked her mother for some ice cream. The mother said, "No, you can't have any". The little girl challenged it and said, "Why?" "Because", the mother said, "you are bad". Well now, this little isolated incident apparently doesn't mean anything but a good many of us have learned through this kind of experience being repeatedly directed to us, this kind of a fundamental definition, that we are bad, that we are mediocre, that we are very inferior, that we are worthless, this type of thing. Perhaps some of you will recall the psychiatric definition, the description that was made of Lt. Commander Queeg in the Caine Mutiny Court-Martial, the man who was driven by the need to overcome the feeling of inferiority, absolute worthlessness, or what-have-you. Well, what has this got to do with a track athlete's performance? I recall one man with whom I did considerable counseling work. He was an athlete. He came to the university with average high school performance but began to develop very early in his athletic career signs of real promise. This man had learned that he was no good; this was his basic idea of himself, a very inadequate and inferior individual. And it was very interesting - looking at it from a scientific, stand-offish sort of way - very interesting to me to see what he would do with his own

athletic achievement. He initially believed that he would probably not be able to make the freshman team. He made it. So what did he do? He said, "Well, it shows that freshman athletics aren't of any significance". Then as a sophomore he began to win in competition, open competition, occasionally. Did this change his opinion of himself? Not at all. He simply said, "You know, it's amazing how wrong I've been. I always thought the guys who won in these events were really good, but it turns out that they are not". Because, you see, he was doing all right and so he held to them. The successes he had had very little effect on his over-all evaluation of himself, rather down-graded his evaluation of the competition. Now I can't say that this is why this man never became a national champion but I am suspicious that it's important that he never could shake away from the basic idea that "I am not very good", and that his sporadic efforts to the contrary had very little effect on him.

Let me step aside from Track and Field here and give you a hypothetical example. Suppose that I believe that I have no talent as an artist at all - I think I am very inferior in my art work. I use this example because I do believe that. Now suppose in spite of this, I decide for a hobby to paint a picture and suppose I show it to someone and he says, "Why, that's a remarkable picture - it's very good". What will I do? I will say, "Well, it just shows you don't know art". Now suppose my friend is convinced of his own judgement and says, "Now wait a minute; I know that's a good picture", and he gets an art critic and brings him in and shows him the picture and the art critic says, "That's a fine painting". I simply say, "It shows what I have always thought of art critics - they don't know what they are talking about". Now we have other people come in, perhaps a large number, and they all say it is a fine performance. If it is very important to me psychologically to hold to this idea that I am no good as an artist, I may be forced to change my evaluation just this far and say, "Well, this one was fine. This one was a rare performance. I was just lucky to have accomplished this". And, if it is very important for me not to change this, I may simply not try any more painting at all for fear that I will somehow have to shift. Because in certain personalities it is important to hold the idea of inferiority, but for our purpose this morning, rather than to belay this point further, let me just point out that if the individual has a basic feeling of inadequacy and inferiority, this will change only very gradually. We cannot expect anything to shake this quickly. Furthermore, in such personalities it becomes somewhat intricate to set up goals for them which they can achieve or at least can achieve quickly.

Let me illustrate what I mean. Suppose we have an 880 man and suppose he will run 1:55. Suppose we feel on the basis of what we have observed of him and what we have learned in our experience in track that he is capable of bringing that within the season to 1:51. Suppose, on the other hand, that he is willing to accept the idea that he might cut it down to 1:53, but knows that he is so hopelessly inadequate that he will never get down to 1:51. If we keep (I think this would be true - I don't have the experience in track but I think it would be true in other areas) if we keep hammering at this man 1:51 but he keeps running 1:53.2, 1:53.4, 1:53.1 - approaching his own goal but never our own, he is actually not likely to experience any success at all. Everytime he falls short of 1:51, if he has the basic idea of "I am inferior", this fact only reinforces it. I think it behooves us as coaches or as instructors in academic work who are dealing with an athlete who has grave doubts, to consider the possibility that if we hold out goals for him that are not readily accomplished we may merely reinforce the feeling of inferiority. This ties rather directly to the matter of goals so let me move on from that and I will, in moving on, keep this thought in mind and return to it.

If we wish to improve motivation and morale, it behooves the coach or teacher to set goals that are concrete and realizable. An individual or group with a goal that they can clearly see is more apt to achieve that goal than an individual where the goal is very intangible. But goals alone are not enough. In the first place we need to see some evidence of progress toward that goal, and secondly, we need to believe that it is possible for the goal to be reached. The individual who has set up for him - let's go back to my 880 man again - the man who runs 1:55 and has been told by his coach that he can run 1:51 - to become a goal he has got to at least be willing to acknowledge that it could possibly happen. When he says within himself - whether he verbalizes it out loud to the coach or not - "This is impossible because with the kind of man I am there is really no goal", it may be the coach's goal but it isn't the athlete's. Usually we find that when individuals set goals for themselves, these goals are a bit beyond what they have accomplished so far, but are still psychologically within the realm of their beliefs. When they achieve those goals, it is normal for them themselves to set new goals beyond these. On the other hand, when a person has goals which are beyond accomplishment and there is repeated effort to achieve these goals which always fall short, there very often follows a whole lowering of the goal of the individual. Usually repeated failure results in a lowering of the level of aspiration rather than maintaining it at the level it was before. So we, as teachers and coaches, are very important to setting goals for our students; I think it behooves us to set goals that are realizable. Furthermore, there is one special phase

in goal seeking behavior in athletics which we might make note of. They probably apply in classroom work too but it is not as easy to demonstrate. That is the matter of the plateau. In many physical performances, as I am sure you know, there tends to be a plateau and for a long time there will be no evidence of improvement and then suddenly improvement takes place. If this is characteristic of the event in which an athlete is participating, it behooves us, I think, to make him aware of that so that he will realize that this failure to progress is to be expected and pardoned and part of the training process. Otherwise he may give up.

Then there is just one further point I wish to make this morning. That is the question of whether the goals that a person is trying for are the open, apparent, intrinsic goals of the path themselves, or whether they are something completely outside. I was talking with a coach - again another group rather than Occidental track men - this year. He made this remark concerning one of his athletes; I thought it was very interesting. He said, "This guy doesn't get all piped up when running - he just likes to go out and run". Now what he was saying, I think, was that as far as he could see it, and he perhaps was right, for this athlete the goals were "near the path" themselves. He was out there trying to do well in this event and that was as far as it went. On the other hand, not infrequently we find a person competing both in the classroom and in athletics for goals which are quite aside from the athletic or classroom learning themselves. Let me give you an illustration. Some years ago I knew a student who graduated from his university at the top of his class. In an academic rating system where 3.00 was straight A, his grade point for four years in college was 2.94. He had some B's in physical education. This man, as far as I know, never received a grade below an A on any examination taken during his college career. Despite this fact, as late as his junior year, he was ordinarily so sick on the day of the examination that he could hardly take it. He took many of his exams late, he took many of them in the infirmary, and so on. Well now, what was there about them that in spite of his success made this man so emotionally involved as to whether he would succeed or not? The night of his graduation I attended a party given in honor of several of the graduates of that class. Gathered in a little circle in the corner were this particular student, the student's father and several friends. The father made this remark to his son who was at the top of his graduating class; he said, "Son, it's just like when you were in grade school. You used to bring home your report cards with all A's on it and I would say, 'Son, that's good. Now go back and do better' ". Without ever meaning to, this father had created the situation early in this boy where the winning was actually the evidence that the important people in his life would love him. He didn't compete any more just to win; he didn't study to learn; he studied to make sure that the important people completely outside the path were going to love him. This is what I mean by having a goal outside the path. These goals oftentimes can be much more important than the goals in the path themselves, but they also are the kind of goals which create time loss, which create great emotional upheaval, which make the individual erratic. And so when we see a student or an athlete who is terribly over-involved, who seems unstable, too tense about what he is doing, we may ask ourselves a question. Is it because he is really not competing just to win the race or just to set a new record or just to beat another particular athlete or just to better his previous time, but rather is he competing for something that is beyond us, outside - parental approval, love, security or what-have-you? Again I don't say how you should handle this, but I think if we think of it as a possibility then we are in a position to decide rationally what we as coaches or we as teachers do want to do about it to cope with the situation.

Well, I have come very close to my forty minutes and if I stop right now it would break the forty minute barrier, but I will stop only to summarize. I have tried to point out for you the importance of competition in improving motivation, suggested that the limits of physical endurance have yet to be defined. I have suggested some of the ways in which attitudes toward the coach may affect an athlete's motivation, and as a result, his performance. I have suggested the importance of team spirit, the importance of the confidence that the athlete has in himself and how this may undermine his performance. I have suggested the importance of the goal and the importance of progress toward that goal. I have not said much about the importance of communication; I would like to close with that thought. One of the most important ways to maintain morale and motivation is good communication so that both the student and the instructor speak the same language and understand one another. I think this is fundamental in coaching and teaching and all other lines of human interaction. Thank you for your attention. I wish you all well. Those of you who have athletes out there tomorrow or the next day - I must admit I hope certain men in orange shirts show particularly high motivation. Thank you. (Applause).

Chairman Jordan: --I would like to say on behalf of the group and for myself, Dave, that we are very, very grateful to you for taking time out of a busy schedule to come over and give us this outstanding and enlightening talk. I know that every one of us can profit from it.

(Here there was a fifteen minute break; the meeting resumed at 10:30.)

Chairman Jordan called the meeting to order and repeated the announcements he had made earlier: (1) Credentials for the coaches and where to pick them up, and (2) The luncheon for Big 10 coaches and athletes and the arrangements which had been made for their transportation. He then proceeded to introduce the next speakers.

"I take a great deal of pleasure in presenting to you for our second session of the Clinic, two of the most outstanding men in the field of research and study in the field of athletics. Both men are vitally interested and active in sports, and particularly in Track and Field. I know that all of you, on numerous occasions, have read articles, books and also reports of clinical sessions such as this by these men. They have been most helpful to us in our work in Track and Field. Dr. Morehouse is now associated with the University of California at Los Angeles; previously he was at the University of Southern California. A graduate of Springfield College, he has done work at the University of Iowa where he was a research professor or associate in the School of Medicine, in the Physiology Department. He later went to the University of Wichita as head of the Department of Health and Physical Education, then moved to the University of Kansas at Lawrence as Director of Research in Graduate Studies in Health and Physical Education. During his career he has been particularly active in Aviation Science and has done a number of books on the Physiology of Exercise and Kinesiology. He was recently elected an active fellow in the American Academy of Physical Education. He is one of the most outstanding men in his field and I am sure he will contribute a great deal to our knowledge and will help us in our thinking about the sport we are most interested in.

Dr. John Cooper is from the University of Southern California, Associate Professor of Education and Physical Education, specializing particularly in research in Human Performance. He received his doctor's degree from the University of Missouri. He has had many, many hours of graduate work at Columbia University. His teaching experience, Missouri high school for a number of years from the 30's to the 40's; assistant basketball coach and physical education instructor at the University of Missouri from 1940 to 1942. He has also worked with Dr. Morehouse on Air Force training and physical education programs. He has done a great deal of work in collaboration with Dr. Morehouse - the two of them have gotten together on many studies that we have read and enjoyed. He is also co-author with Dr. Morehouse of the textbook on Kinesiology - in fact, these two go hand-in-glove. It is indeed a pleasure to have them appear before us today and I would like at this time to turn the meeting over to them. Their topic will be "Mechanical Efficiency and Endurance" and I am sure they can give us a great deal of help in thinking for our own activities. Dr. Morehouse and Dr. Cooper."

MECHANICAL EFFICIENCY AND ENDURANCE

Dr. Laurence Morehouse, UCLA and Dr. John Cooper, USC

(Cooper) Thank you, Payton. We appreciate being invited here. I tried to compete myself and have got a great deal out of watching these track men. I particularly like the short distances, the sprints and hurdles; Dr. Morehouse handled all the boys in this area that were interested in distance running. They had associated the two of us–our offices were adjoining–with this type of question and every now and then one of those long distance runners would knock at my door and ask if Dr. Morehouse were in and I'd say "No", and they would say, "Can you help us?" and so I'd get not only all the sprinters and hurdlers but all these distance people. I wasn't too interested in these distance men; I liked the short ones. We have a list of questions we thought we'd try out on the panel, but I see that the panelists are down here in front of us; I guess they didn't want to be conspicuous. We're going to introduce our ideas in question form and someone around here will try and answer. We are not going to exclude you fellows just because you are sitting down here in front. If the audience is not satisfied with the questions, or with the answers, we want you to ask another question or to comment any time you like. Now Dr. Morehouse, as we have said, is interested in endurance and practical physiology and I am interested in mechanical movement but we are not going to limit ourselves to this area. We will not always agree–we're to close to flatly disagree, but we don't always agree. Don't let that bother you, we're still good friends. Now some of our ideas come only from laboratory experience. You are the fellows who can try them out and if you are interested you can put them to work. We plan, if time permits, to present some new ideas as food for thought and we'll tell you if we have any supporting data. We might think this is true but we don't have any supporting data, or we do have the data and we'll be glad to tell you about it. Now, without further ado, let's get right into the questions.

We have a list of questions, not all of which may interest you but they interested us, some of them exceedingly. The first one is this matter of weight-lifting by track athletes, by shot putters and even by javelin throwers and sprinters. We want to raise the question, "Does weight training affect the muscular mood?" I looked into the research that has been done and from my angle, not necessarily from Track and Field, I found out these things: from the five or six research studies done on it, it appears that weight training tends to increase the speed of muscular movement. Speed in coordination has been increased, which tends to favor weight training; those boys who did the weight training tended to increase their efficiency. Now I'm just summarizing briefly what some of these studies said and what we learned from them. Now Parry O'Brien has been doing weight-lifting on his right leg as fast as he could and he had quite a bit of weight that he carried in order to get the push. I have a film and the story on Parry O'Brien that I'll give you later and he even gets more than he does in this film since I took the film about two years ago. Larry, do you want to make a comment?

(Morehouse) Well, the comment I have is "Big muscles–fooey". Big muscles don't always necessarily mean power. For instance, you see a boy with a large gastrocnemius muscle and you think "Boy! This fellow will make a good runner or jumper". Now this hypertrophy involving muscles may be significant because they are related to a very poor mechanical joint in the foot, a very poor power arm of the foot lever. This hypertrophy may be just an adaptation–the muscle has grown up to take care of this very poor lever assistance–and many times you find a boy with a very thin foreleg, practically no gastrocnenius muscle at at all but he has a very powerful leg. This is because of the very good mechanical advantage he has in the bones of the foot and he doesn't need to have this big development. Also, muscles can get in the way–muscles half latent–and this hypertrophy adds pounds that have to be carried around. Another point related to this is that running does not require very much power. The greatest power needed is in getting off the block; once you have started, very little effort is required to keep your legs going and to keep yourself moving. It's more a matter of ballistics and mechanics than it is of actual leverage and power drive. What we need here is speed of movement which may be held back by extra weight at the long end of this pendulum so if you do do weight lifting or the slow resistance exercises to build muscle bulk, you want to watch for these things.

(Question) Are you aware of any study that deals with the amount and time of weight training?

(Morehouse) Yes. We are engaged right now in a study at the County Hospital, a study very much related to athletics on the effect of progressive resistance exercise on speed of movement and other functions. Our results are somewhat similar to the ones that John has suggested, that is, increase in power resulting from slow resistance exercise doesn't necessarily limit speed. You don't get muscle-bound in a regulated program of resistance exercise. But the thing we are finding is that the exercise is very specific. We have tested one leg just pulling against what we call "isometric flow", where you don't shorten leverage, and we have exercises in isotonic matter where we have them raise and lower a weight.

We found that although they were most capable in raising and lowering weights after this period of training, they didn't get much gain in the development of pull against the isometric resistance. This is another indication of specificity of training; in training you have to use the movements that are going to be used in your sports activity if you expect to get gain. Running slow will not train you to run fast, and running sprints will not give you endurance for long races. Throwing heavy javelins will not improve your ability to throw a light one. Putting a 25 pound shot will not improve your ability to put a 20. We have run experiments along this line over and over again; every facet that we investigated along this line reaffirmed our position that specificity is very important. In fact, the athlete, once he has developed his organic condition in early season training–the athlete who is not performing his events during practice may be wasting his time.

(Cooper) Just to make another comment here. Weight training doesn't say just how much weight was lifted but it appears to me that as long as the boy could move fast, he can increase that weight. According to these studies and according to what little we have done, it will increase his speed as long as he can move, and that as soon as he begins to do something else with his legs, then it isn't specific to the movement. I think this answers the question. It has to be specific to the movement you are training for. If you want your man to move fast across the ring, you have him work on an exercise designed to make him move at that rate.

(Morehouse) That's right, John, and also the range of motion in using weights is quite important. If you use weights, be sure to go to complete extension at the end of every move, in fact, go to hyperextension if you can in order to keep the ligaments and tendons fully stretched. If you exercise in shortened position then you tend to develop in a shortened position which may decrease range of motion. (Cooper) That's where we got into this context of "muscle-bound". The boy moving in such a short range developed that movement for the short range and then when he wanted to try in a long range, he couldn't. But if he does try it in the long range, there can be no doubt that it will not affect his whole movement.

(Question) You made the statement that doing these exercises probably did not decrease the speed. I am wondering over what period this study has been made on specific individuals. (Answer) The training period for this experiment runs from two to four months. (Question) Do you know of any studies that have been made over a period of years? (Morehouse) The only study I am acquainted with is one in which they compared men with larger muscles to men with small muscles which would give some index along that line. Perhaps it isn't an accurate one but in this study it was observed that the men with the larger and more powerful muscle had the greater speed in motion. (Cooper) I had noticed the same thing. I had picked boys with larger muscles in a group with those with smaller ones and I think the average was greater with those with larger muscles.

(Question) How about flexibility? (Cooper) The next question we had on our list hinges on that. We asked this question: "Does weight training tend to reduce the range of motion?" and that's in line with this flexibility. It tended to increase it in the muscles the man used, but in those not used it decreases. This was in a six months training period indicating that if you are going to do a lot of weight training with your boy, then they have to use those other limbs which are used for stability purposes. They will not lose any of their range with the limbs that have been used provided they do as Dr. Morehouse suggested to go on through with the program.

(Question) You mentioned the need for specificity in training. I wondered if there has been any research done or if anyone is working on specific weight training exercises designed to improve, say, discus throwing or shot putting. If so, would they be available? (Answer) That might be a good project for someone to work on. As far as I know, no one is doing that right now. It would be quite a task because you have to consider the speed of the motion, the arc through which the joints move and the amount with which the member is loaded at that time in order to make it specific. I'm not sure it would be worth while to go to all that trouble. I think that if weights are used to improve muscle power, that they should be used before the competitive season starts. If you are using it during the early season and you are doing it with the knowledge that you are building your man for a later performance, you must be satisfied with him at the present time. You might be detracting from his present performance.

(Question) Did I understand you to say that you can't improve a shot putter by having him throw a loaded weight? (Morehouse) You can improve his power–that is, before the season starts–by doing this heavy work. But once he is drawing on it, then it's a matter of coordination and this specificity factor really shows itself. We have measured–this is more of a warm-up effect–we had shot-putters put a 16 pound shot for the experiment and we had them warm up with a 20 lb. shot and a 16 lb. shot and a 12 lb. shot. The theory was that if they put a 20 lb. shot a few times, that the 16 would feel so light they could put it out longer distances. We set up an experiment and we ran about a thousand trials in this experiment and we found a high statistical significance that warming up with the 16 lb. shot gives by far the

better performance than warming up with either the heavier or the lighter shot. In other words, warming up with the implements that you are going to use. Now other studies along this line lead you to believe that even in baseball, if you swing three or four bats when you go up to the plate, you ought to throw the extra bats away after you have swung them a few times and swing the bat you are going to use three or four more times to get the feel of the bat. It destroys to some extent the kinesthetic perception of the instrument you are going to use. (Cooper) You move slower with the heavier shot, therefore it would depend on the speed you want to use.

(Doherty) I have been reading through the questions you have in mind and I think there are a lot that are exceedingly important to us. As I look at it, it is your purpose to suggest these problems and questions and possible solutions, etc. and try to cover the field rather than to go into any one of them. (Cooper) Yes, but we will do anything that you want. But right now we ought to move on. Dr. Morehouse is particularly interested in diet, in clothing, and in milk and water drinking, in salt taking, in honey taking. He'll just sum those up quickly unless there are questions from the group.

(Morehouse) I am very much interested in the problem of nutrition of the athlete and every spring I attend the Federation meeting, the American Biologists, and I talk with biochemists and physiologists who are working on nutrition. It keeps me up on the latest hot dope on what is good for the diet of the athlete. The answer has been the same for the last three or four years, that the best diet for the athlete or anyone else, is a diet containing a wide variety of food served in amounts adequate to maintain a normal body weight. That is the modern day definition of good nutrition. Now the importance of a wide variety of food is to be sure that we get all the vitamins and minerals and other substances we need for good functioning. Now it's thought to be pretty stupid to take vitamin pills and then feel that you have good nutrition as a result of that. Today we know a dozen or so vitamins. Five years ago we only knew about half a dozen. Ten years from now we may know a few hundred vitamins. Whereas today we are worried about the B^4 vitamin, there may be another hundred that haven't been discovered yet that we will be worrying about ten years from now. You can see that this is a rather ridiculous situation. So when you take some special food substance like wheat germ oil or some other expensive product, it really is a commercial gimmick. You are getting calories from these things in a highly expensive form and they do not add anything to your nutrition. You can't build up vitamins, your body excretes all it doesn't need. While I am on the subject of pills, I should remark that you do get results from pills. There is no doubt about that. No matter what is in the pill, if the athlete thinks it will help, it will help. We have performed experiments with oxygen; we have marked tanks "oxygen" which were filled with room air–this was done at the University of Iowa Medical School–and we have had subjects hold their breath almost twice as long after breathing from this tank marked "oxygen" and filled with room air. In a series of studies at Springfield College we had swimmers breathing out of bags; some of them actually did contain oxygen and they didn't do as well after breathing the oxygen marked "room air" as they did after using the room air marked "oxygen", so you can see there is a motivation or psychological value which is the big factor here. As far as sugar is concerned, you have to work hard for about two and one half hours before you begin to get a depleted blood sugar. This is a result of a study of marathon runners at the Harvard Fatigue Lab. Most athletes have an elevated blood sugar; we measured blood sugars of track men and wrestlers and in a competitive situation they had highly elevated blood sugars. The question here is if you add more sugar to an already elevated blood sugar you are very apt, and we found this in some cases, you are apt to call forth a very mild insulin reaction which drives your blood sugar out of your blood into the storage organs, so that as a result of taking added sugar you end up with a low blood sugar or low available sugar. But don't monkey around with that. Don't feed these sweets. If an athlete is hungry for sweets then maybe he needs more and he can take them if he wants to, but the idea of urging these heavy sugars such as honey and concentrated sugars! And don't buy sugar pills, they're so expensive. And just because they are called "dextrose" or something like that, they don't digest any faster or give any more energy than an ordinary lump of sugar you can buy for one tenth the price.

(Question) How about milk making cotton-mouth? (Morehouse) Well, this is a folk-tale about the fact that milk affects respiration in some way. We have done studies of athletes running until exhaustion in laboratory situations after drinking milk and we could see nothing that would be significant enough to make a study from. The idea if you drink milk it forms cotton-mouth or affects the respiration somehow, seems to be without basis of fact. Now I think that just as I was coming to the mark that I wouldn't take a glass of milk at that time but you're not going to take anything like that within a half hour before an event anyway. And even if you did, a sip of water afterward will take away any film that might be in the mouth. I think discouraging athletes from drinking milk is a pretty rough thing because milk is such a very nutritious food in an inexpensive form. You are doing the athlete an injustice if you discourage him from drinking milk.

(Higgins) Will you say something about the effects of smoking and drinking? (Morehouse) Yes, and also John has reminded me about salt. I have had a lot of experience with salt, personally and experimentally. Monkeying around with the salt balance of an individual can be very dangerous. There are some studies recently of kidney functions showing the effects when you overload the body with salt. It can do permanent damage to the kidneys if you overload with salt. I used to use salt in a weight-reduction program. The idea that you salt up and then wash out and then withhold water–it certainly is effective for losing weight. You can drop down–you can get 5% of body weight off in four days very neatly by this process, but I certainly wouldn't recommend it with what we know now about kidney functions. Salt tablets produce a brine situation in the stomach that is very irritating and some athletes will vomit after this condition. Salt mixed in with food is the best way to get salt. If you give salt tablets, a good general rule is that you replace the salt by giving one tablet for each three pounds of water loss. It is a good general rule-of-thumb and if you are giving more than that you are running the danger of oversalting the athlete. If no weight is lost then there is no need for extra salt. The only reason you are giving salt is to replace salt lost in perspiration and weight loss is a very good indication of how much salt is lost. I would say that as a general rule, if there is less than three pounds lost in body weight, there is no need for salting.

(Cooper) I'd like to make one other comment and then we'll go on to another question. If the athlete can't seem to drink enough water–just can't satisfy his thirst–the chances are that he has lost a lot of weight in perspiration and has lost salt, and he needs salt at that time. Anything else you want to tell them? (Morehouse) I think the remedy for that is salt in the food, ham or bacon or potato chips or other forms of salt in the food rather than salt tablets. As for salt tablets, you learn by experience if the athlete can tolerate them. If it doesn't make him ill then you can encourage him to take one salt tablet for every three pounds of water loss.

(Cooper) Now Ralph Higgins has asked that you comment on smoking and the taking of alchohol. Do you want to comment on that? (Morehouse) Well, the literature is getting more and more full of scientific reports on the effects of smoking and it is pretty easy to tell which reports are biased. The writer usually gives himself away right off the bat in the introduction of the article; you can tell whether or not he is against smoking to begin with. There are some people still who put articles in scientific journals who are trying to sell something. They start out with the idea that they know smoking is bad so they will perform experiments in such a way or just use certain data or exclude subjects that don't show that smoking is bad. It is fairly easy to identify these articles, but studies which are carefully controlled and honestly done fail to show any detriment to performance of any kind as a result of smoking in habitual smokers. In general you can class smokers into two types: (1) the tobacco-sensitive smokers and (2) the others, the people who are not tobacco-sensitive. Now those who are tobacco-sensitive will have a tremendous reaction to tobacco and they don't have to inhale to get this reaction. They get a change in their electrocardiogram; they get a bizarre vaso-vago response; their eyes dilate and they'll get sweating of the forehead; they perspire and there are blood changes throughout the body. Well, obviously these people are not in good condition for the performance of any type of activity and certainly if they were athletes they would not smoke just before a performance. The people who can tolerate tobacco, who are not tobacco-sensitive, don't seem to have any response at all to tobacco smoking. (Cooper) Now he is not advocating that athletes smoke. He is just stating the facts of what we have found out on tobacco smoking and performance. (Morehouse) We performed one study in our laboratory where we had been running to exhaustion and performing to maximum exertion, starts, jumps, grip dynamometer strength and the like. Our results confirmed others that smoking just before performing by a habitual smoker did not affect his performance as compared to how he did the same task without smoking.

(Cooper) There are many variables there that we don't have time to go into. Now will you make your comment on alchohol?

(Morehouse) There is no doubt that alchohol affects performance. Alchohol is an anesthetic; it depresses the activity of the central nervous system. It slows reaction and affects breathing but for some reason it seems to improve hearing. We cannot understand that. Alchohol taken in small quantities actually can improve the appetite and relieve tension and in studies we made for the Air Force, we found that a small quantity of alchohol actually improved the performance of a second task performed after completing the first task. They made less errors in the second task. This certainly couldn't be compared with a track or field performance. Steadiness, accuracy and coordination are deteriorated by alchohol. People vary to a great extent in their susceptibility to alchohol and this variability exists not only from person to person, but in the same person from day to day or from time to time during the day. It is difficult to say–to predict–what the effects of a known amount of alchohol will have on the performance of an individual. In general, you are on very solid ground when you restrict or encourage the restriction of alchohol in athletes.

(Cooper) I think that unless there are any more questions, we'll get off this subject entirely and discuss something about force distribution on the blocks and sand pits, etc. and that is the area I am particularly interested in. I brought up here a little gadget that some of you might be interested in seeing. This is a hydraulic setup on starting blocks. Now I have set down some questions I was interested in and maybe you will be interested in them too. I think we have some of the answers. The first question, "What is the distribution of force against the starting block in sprinting?"

(Editor's Note) Since Dr. Cooper used his starting block and a graph in his discussion, the spoken record is not too intelligible. The following has been substantially condensed.

(Cooper) This is the rear block here; this is a graph of the force that is exerted against the block and this is the front block and this would be the time element. In almost all instances the runner put more force on this rear block. This is true in almost every instance in the test and we tested almost everybody we could get. At first we made it a rule not to take a sprinter who couldn't run 10.1 or under and we took everyone we could get from U.C., Oxy and other places. I've had five years of this and it appears to be almost a pattern with very few exceptions that the rear foot does the hardest pulling but in the shortest time, whereas in the front foot, the force is on longer but not as hard. I had a film I wanted to show here but someone has borrowed it so I don't have it to show you. But there are several things I found out after looking at the film. You probably know these already. When the sprinter starts off the block, his feet work like the cocking of your hand when you are throwing. He puts his foot here and when you say "get set" and then he gets the signal to go, his foot goes back like this. He actually jumps from the block; it isn't a step out, he jumps. . . . There is no relationship between force against the block and how long it takes to go five yards. I can't find any relationship. . . Three or four years ago we had a little halfback who was tremendously fast on the start. Well, he practically tore the machine apart when he started. He just rammed those feet against it and came out digging and I had to readjust the machine several times in order to keep it from being broken. But it had no relationship to his speed up to five yards. And Franklin Henry has shown that there is no relationship with his running. Of course, we all know that a sprinter who comes off and runs fast for five yards may not be the winner but I was interested only in the first five yards.

(Question) Does the length of time that the front foot pushes against the block have anything to do with speed as compared with the other one? (Cooper) Yes it does. The runner who reverses this situation we have here is invariably slow. In other words, if he has more time on his rear foot than he has on his front foot, then he is slow. (He goes on to tell at some length of his attempts to get Mel Patton to take the test. Patton had the opinion that the emphasis was all on the front foot.) We had a pretty fair little sprinter who did something like this (illustration on the graph) but the majority of them fit the picture I have shown you. I can't say that it is right; I'm just not particular about how they look. The idea is to get out and get running as fast as you can and therefore you should have more time on your front foot, but if you do not get your push from your rear foot, then it appears to me that you are losing some of your race. Once Mel (Patton) came back telling me that this boy Conwell indoors ran without the rear block so I made a study of this. I debated just how I was going to do it, whether to take experienced sprinters or runners who weren't experienced and I finally ended up thinking I'd better take inexperienced boys to see the effects. So we had them learn to start with the blocks–both blocks–and then we took away the rear block. In every instance the boy was slower at five yards with the removal of the rear block. It still may not show anything, but it did with this group of boys; it showed that the rear block was important.

(Question) Dr. Franklin Henry's research has been quite extensively reported. In general did your research support the results that he has already published? (Cooper) Yes, it did although I disagree with a couple of things he says. (Here he explains the terminology which Bresnahan and Tuttle used in describing the starting stance, the front or bunch, the medium and the elongated.) Now we eliminated the last one and never used it because sprinters don't use it anyway. We called the elongated start this position here (what might be called "medium elongated") rather than the one Bresnahan and Tuttle described. Well, aside from the one second holding time–if you have no holding time except this one second, then the bunch start is as fast and in some boys it's faster. It depends on his experience but if you hold him at all, then what you might call the "medium elongated" start is significantly faster. Some of the earlier research by Dickinson and this fellow at Louisiana State, Kisler–he had done some and he showed us the bunch start was the fastest but that isn't true with any of the runners that we have had and I think that in the five years we've had a total of over a hundred runners.

(From the floor) He showed that they got off the block faster, not necessarily with a greater velocity. (Cooper) Yes, he did, but I checked the time for five yards and their time was faster. Now, what's the

optimum holding time for sprinters? As you know from research that has been done in the past, it is slightly under two seconds. We held most of our runners about 1.7 seconds. This means that the starter who holds the runner two seconds or longer, according to the rule, is interfering with the runner getting off the block and if he holds the runner maybe three seconds or more, it seriously affects the runner's ability to run off the block.

(Question) Did you have any experience in checking the reaction to the gun if the runner is held? (Cooper) Well, now, we had this big Dick Attlesey, the high hurdler, as one of our subjects and in the department adjacent to where we were doing our experiments, there was a lady showing a film to some students of hers . Every time that film would click, he'd go, he'd start to run. We'd line him up and he was so conditioned to sound that even the click of this camera would set him off. I finally had to go over and ask the lady if she would please stop running the film until we got finished. Dick was the most highly attuned to sound of any fellow I've had. He was so conditioned that he'd go right off at this sound.

(Morehouse) I think there have been studies made that show that if you concentrate on sound rather than on the mechanics of movement, that you will go faster. (Cooper) I haven't run any experiments on that subject so I wouldn't know but I think that's right. Now, the next one: "What Effect Does Different Foot-placing Have on Starting Time?" I think I discussed that in connection with elongating. The next question is, "What Leg Should be Placed at the Front Block in Starting?"

Now this is especially interesting since we just conducted a study on this last fall. I had a student–I have these studies with me if you care to look at them afterwards–I had a student who wanted to see if the size and strength of a leg had anything to do with the placement on the block. Most of you here are right handed and most of you start with your right foot back. I know I do or I try to, I put my right foot back. Well, we debated as to what group of subjects we would use and we finally ended up with ones that didn't have any experience because we didn't want anybody that already had a predetermined way of running. Then we measured their girth and size and then gave them a dynamometer test to see what the strength of each leg was. Surprisingly enough, the boy who hadn't run, the boy who started or replaced his leg—they all started with their right foot back. We would place the strongest leg at the front and it had a statistically significant difference. We conclude from this that a hurdler who had switched this leg position in order to get over the first hurdle and so forth and came out of there very fast, probably had something there. The strongest leg was to the front because of the length of time it's on the block. It should be in front. I didn't know that myself until this fall.

(Question) Should we stress more force on the front block? (Cooper) Oh yes. I think definitely you should train your boys to use more force on their front block but as Dick Attlesey tells me, before he had stressed the front block altogether and now, after seeing the results of this, he began to stress trying to equalize the force off the blocks rather than to think about the front foot all the time. That's what he worked for. (Question) Is that force simultaneous? (Cooper) No. (He then explains the overlapping of time.) Now because of the time element, we'll have to switch to something else. I had some film but we'll show it later if there is any time left. I have a discus thrower and a shot putter on film and I was going to show you what I look for in these people when I analyze them but we'll skip that now. The next topic we had in mind is "Distance Running and Developing Endurance". Now Larry knows more about endurance problems than I do but there are five or six comments I'd like to make.

First, I think the training of any distance runner should be on equal goals, should be a quarter, perhaps. It might even be a 220, but a quarter seems to be the best distance to train on. If you tell him to run two miles, three miles, four miles, 10,000 meters, you are defeating yourself but if you train him on an achievable goal and then make him run it more and more, it's easier to do. You all know that. Now second. A short stride in distance running takes less energy than a long stride. That's been shown on the treadmill. We ran one study here with our sprinters and our distance runners and our sprinters couldn't stay on for five minutes. No matter what condition they were in–the stride was too long and that takes more energy Maybe that's what Les Steers did in the high jump, where he went over the bar until he got up to about 6' 6" with a western roll and then went to the straddle roll. Maybe it takes more energy–I'm inclined to think it does. But all I know about is runners. The next one; this is where Dr. Morehouse and I may disagree some. I think that rhythm for long distance runners should vary within the 440. To relieve monotony and tension etc. it can vary some within quarters. Now if you do a lot of that, of course, to decelerate takes a lot of energy. Body position is loose, relaxed, and not rigid and you can shake your head and walk all over the place in the distance run and you should. You should be as loose as possible and this idea of running right straight down the track and holding your neck rigid is contrary to energy output. I don't think you should work out every day because it takes too much out of the runner. He should have a pattern maybe of working out three days a week. If he wanted to work out light the other days he could, but you can't take that and we have some boys here that run every day, five or six days a week. Another thing, their arm positions should be varied all during the race. Those are

the six things I wanted to comment on in distance running endurance but Dr. Morehouse is much more interested in that area and he will take up from there.

(Morehouse) I'm glad to hear you use my argument in your statement, that is in regard to deceleration during an endurance race. It really costs energy. You reduce your speed at any point and the energy cost in picking up is really terrific. Mathematically, it is the cube of the energy which was required to maintain a steady pace. Now this is true in all kinds of endurance events, whether it is swimming, or rowing, or running, or anything else. The most economical utilization of energy comes from the maintenance of a steady pace. Now I'll compromise with John to this extent: he can go ahead and change his arm position and his style of running and all that during the race–I'd concede that perhaps, but I'd like to see it tested–but if you change your pace, this causes you to slow down and requires a compensating kick or pick-up in order to recover from this slowdown and that really robs you of energy. You have to conserve this energy and spread it over a long period of time because in any endurance event you are running gradually into debt. Your statements in general, I think, have been accepted in our work in lengths beyond the quarter mile. But in the quarter mile, there seems to be a tendency for men to run the first 220 much faster than the second. It is an endurance event and yet the pace is much faster in one part of the race than it is in another. Any event beyond 300 yards is an endurance event even for a well-trained runner. All maintenance of speed and distance is inclined to fall off; you can't run maximum speed beyond 300 yards. To coach a runner to run the 440 at top speed all the way is unrealistic. Despite the history of world records to the contrary, you've got to conserve energy to run the 440. (Cooper interposes a remark here that the difference in the two halves of a 440 is approximately 21:25.) (Morehouse goes on) Now we have two factors affecting these figures, one is the start time and the other is the kick to the finish. In endurance events, and I would define endurance events as being any race beyond 300 yards, you can get an advantage from the kick to the finish. In any distance below 300 yards it's futile to change your style of running at the finish. You actually diminish your speed by changing style despite the finish kick or a lunge to the tape or any other mechanical aberration at the end of 100 or 220 yards.

Speaking now of the advantages of a kick to the finish, changing the speed or style of running at the finish is advantageous in races over 300 yards because you have been running at slower than maximum speed in order to spread your energy out over a longer distance. Now you are coming to the end and you have no further reason to conserve energy so you can get up to maximum speed. If this requires a change of style of running to do that, then it is useful at that point but for a sprint that is less than 300 yards, that is unnecessary and wasteful. (Question) You are advocating then in your distance of over 300 yards that hard pacing is best. Is that right? All right, steady pace, then. But if a man runs at a hard pace or steady pace, we assume that he is running pretty close to maximum. Otherwise he would be fluctuating and have to pick up again. (Morehouse) Well, he is running close to his maximum for that distance. You are running about 60% of maximum in a mile so you are conserving energy all the way through. You are not running at top speed. In any distance over 300 yards you have to conserve your energy. For the 440 you will run about 86 % of your maximum speed.

(Question) I don't think I understand you too well here. You say that we are running a pretty even pace here and then we have to change it? (Morehouse) That's right. The athlete has to learn when to initiate this kick. With some athletes this is only 20 yards before the finish and some can start 40 or more yards before the finish. It is an individual matter that they have to learn for themselves. There probably is an ideal but I don't know what it is.

(Cooper) I would say that even pace is more clearly brought out in the half mile. Any good half-miler should run an even pace. I agree with Dr. Morehouse on that The only point I am making is that in distance running, long distance running–10,000 meters or so–you should vary your rhythm, your pace and your arm position all the way through. (Morehouse) As long as you don't change speed. . . I've studied marathon runners and they all have different plans on how they are going to run that 26 miles and a large number of them feel, "Now I'm going to get way out in front and get a big lead while I'm fresh so that when I get tired I can take it easy". Well, that's logic but it's not physiologic, because they have built up so much of a debt that they never recover from it and it's seldom that any who run this kind of race end up in the first ten.

(Schlademan from the floor) It's not a pick-up in the quarter, it's an attempt to maintain form. (Morehouse) There is another phenomenon called the "float". But this doesn't mean reducing speed either. (Schlademan) How long did you say a runner can maintain top speed? (Morehouse) 300 yards. (Schlademan) I just hope I get a runner like that. (Cooper) I have charts to show that a runner slows down after he gets into full stride, at about 60 yards. (Morehouse) I base my thinking on this: the 220 is run at a faster rate than the 100. When Roy Cochran was in training for the Olympics he got to the point that he could run the last 20 yards as fast as the first. (Littlefield from the floor) How does it

affect endurance in the 440 to run the first part at full speed? (Morehouse) Well, we can take a lesson from race horse jockeys. They run the first part of the race with the reins and the last part with the whip. I think that if you encourage your runners to get out there and run the first part of the race it will detract from their performance–they hold in at first and then let out toward the end.

Now with all this comment about endurance–what is endurance? We have gotten some pretty fancy notions about what endurance is but it's pretty much what the name implies: the ability to endure fatigue. Now there are certainly some changes that take place in an athlete's body when he runs every day. I made out a strange program for Chuck Tobias in which we were running him 30 miles every day. Don't pay any attention to what John says about running every other day. You can almost predict improvement in endurance by computing the number of foot-pounds of work an athlete does, no matter what sport it is. And if you can lay out his schedule to get more work in every day then you'll get the most rapid and satisfactory increase in his endurance. This is true in swimming and in track and in any other endurance event. Now there are some improvements in the blood chemistry and of course you find it in skill and very slightly in muscle strength during endurance training, but the main thing that changes in physical improvement in endurance is his ability to endure after he is paralyzed with fatigue. The major metabolite is lactic acid–peruvic acid is another way to consider this, I suppose–it's not the same but there is not much difference between the two. You take an athlete at the beginning of the season of training and he will exhaust at about 80 milligrams percentum of lactic acid. He just can't endure that much acid in his muscles; it's too painful; he gives up. Two months later you run him again. In our particular series of experiments we were running the runners uphill on a treadmill so that we could make our experiment last long enough–we didn't want to make them last 20 or 30 minutes; we had to exhaust them in about 5 minutes for our experiment so that is why we had them run uphill rather than on the level. And where they exhausted at 80 milligrams percentum two months ago they now can run through this barrier, you might say, of 80 milligrams percent and can endure their muscles being bathed in this acid solution up to 160 milligrams percent. In other words, they doubled their power of resistance to these fatigue acids. Now, how do we train for endurance? You can't baby an athlete and get endurance out of him. You can't just lay him off every other day; you have to work him and work him and this training for endurance starts after the athlete gets tired. Until fatigue sets in there is no training in endurance. Get the athlete fatigued first and then run him in order to get endurance. That is the only way that you can improve his tolerance to this lactic acid.

(Cooper) Well, I'm going to have the last word here; I'm not going to give up that easy. When it comes to endurance, accept his word, don't accept mine. But I rather disagree a little though not as much as he might think. We had an athlete that came out here for track and every day he ran, maybe 26, 27 laps, but he ran at his own pace and at the end of five months he still couldn't run any faster or any harder. In building endurance you've got to kill yourself, you've got to punish yourself. I agree with that but after he has reached what we think is his peak condition, if you run him every day you take something away from him. I know this from experience and that's why I must disagree with Dr. Morehouse. This fellow ran every day and I watched him. One day I said to Jess (Mortensen), "How fast is this boy going to be able to run by the end of the season?" "No faster than he is running today; he'll still run a nice easy pace that won't hurt him". I agree with that; you have to work out a schedule where he doesn't run just pace every day but I still say that you can keep up your endurance with about three days a week of hard work. I'm not going to give him a chance for rebuttal; I'm going on to another subject.

The next question we have here is on the idea of head-shaking. We've all seen athletes who did a lot of head-shaking before they performed and some of them shook all over the place. You will remember that Glen Cunningham used to do that many years ago. I used to watch him coming down the track shaking his head and I heard fellows say in the stands, "I guess he's showing off a little" and I've even heard athletes make the same comment. They certainly said it when Fuchs did it and I've watched Parry O'Brien –he struts around and shakes himself but we don't laugh at that. As we begin to study more and more about anatomy, we have come to the conclusion that since the neck has the most important focal center of nerve endings, that that is one area that should be moved for a feeling of well-being and also a feeling of condition. It's a good stunt for them to do that. The more they do this before they perform, the more sense of feeling they have, particularly in the arms. (Morehouse) I don't know whether John warned you or not, but you can overdo this. All of these extraneous motions take energy, take effort, and put an extra load on not only the working muscles but also the supporting muscles as well. I would tolerate a little of this for some release of tension but - - (Cooper) I'm thinking about the warmup, say a few minutes before each put. I think it's a good idea; during the actual contest, be steady. (There was an exchange of comments here about the warmup.) (Cooper) Tell them about procedure in warming up.

(Morehouse) Well, this isn't any new idea; this is the result of a series of studies which have been

done in Europe. You know European coaches and athletes think we are crazy with all the heavy warmup we do. They think we are really sapping the energies of our athletes by giving them such hard and strenuous warmups. The United States is about the only country where so much emphasis is given to warming up. We ran a series of studies using an ergometer rather than a runner to test endurance and our results were that in four out of five cases, endurance was greater without a warmup and in the fifth case it made no difference, so we are going to study this thing further. In general I would say, and this is based on other knowledge, that it is the task of the athlete to achieve a steady pace of metabolic activity and to maintain it for the length of the race. If he is well trained he can do it in spite of the hard work during the warmup. But as for an athlete who is not trained up to that point, not highly trained, you can sacrifice his performance by giving him too rugged a workout or warmup.

(Cooper) Anybody want to comment on this? He is saying that if you run a mile as a warmup before you compete in the mile that you have taken away some of the energy that you want to use in that mile later on. (Morehouse) Unless this is a very highly trained athlete. (There was some discussion here among the coaches)–(Morehouse) Now any violent activity such as your field events or the sprint should be preceded by a thorough warmup to prevent injuries but in an endurance run, or in some activity which has a lower level of physical violence, you might say it is questionable whether a heavy warmup should precede that performance. . . . I would extend this to events over the half mile, not including the half mile. (More discussion here).

(Morehouse) I could comment just a little more about the warmup. I am becoming very interested in a basic reflex phenomenon which I think some athletes are employing and which we should study further and that is, the idea of concentration. For my own purposes, I have tagged this thing "the law of opposites". If I push my head around to the right and then come to a stop again, there is a feeling that I want to go in the opposite direction too. If one of your shoes becomes untied, you tie it and then your other foot feels it has to have something done to it too. There is some kind of opposite action there. I believe that it has something to do with concentration before activity or quiet before activity. Athletes discipline themselves; they sit down, preferably in a quiet room by themselves, and have taught themselves to be inactive, to be quiet, even to lie down, and this restricted activity leads to a desire for activity. I think this whole area needs a lot of investigation. The method of concentration–what should the athlete concentrate on in this period of inactivity before activity? Maybe when you visit us again here in the next few years we'll have some more information along this line. Maybe there is nothing to it.

(Question) Will you be cooperating with the Psychology Department when you make such a study? Yes, they will be interested in this. (Question) Has there been any follow-up on these studies on the fact that the warmup carried on to the point immediately prior to the event is not good? (Morehouse) The few studies which have been made do not show that warmups contribute to performance in an endurance event. (Cooper) That's his theory. (Morehouse) No, it's not my theory, John. It's experimental results.

(Cooper) There is just one point I want to make. Regardless of what they did, I think that if you expend the energy before any major endurance race, then you have less energy to expend in the race, particularly if that energy is expended immediately before the race. Now we have a few more questions. Here's one: How should the performer breathe before and during a performance? We have had some experiments which may throw some light on that subject. We know that the runner, when he goes to the mark, especially in the short races, always takes a deep breath. And we know in the case of the underwater swimmer, that if he takes a couple of breaths before he goes under the water, that he can stay under the water longer than if he didn't. And also, in certain events, if you hold your chest rigid while you are performing, as compared with moving it up and down, you may interfere with the motion of the body. There are some other comments to be made here which I wish you would make.

(Morehouse) Well, hyperventilation throws off the carbon dioxide but doesn't help you get too much more oxygen. The main thing is to throw off the carbon dioxide. Holding the breath a little longer is valuable for breast-stroke swimmers who have to swim the first lap under water and perhaps part of the second. In a sprint runner, if he tries to hold himself fairly rigid for the hundred yards or even for the 220, this would be desirable. However, this can be overdone. If you take more than four deep breaths, emphasizing the expiratory effort, then you wash out a little too much CO^2 and you affect the central nervous system to a point where you may miss the start. You may throw off your coordination for the start. If you use this hyperventilation before the start, remember that three or four ventilations are enough; don't go beyond that. Now about this chest position. There have been studies made in Germany showing the effects of the position of the chest cage on respiratory efficiency. If you hold your chest in an extended position, it so affects the position of the diaphragm that it interferes with its excursion so that it limits ventilation efficiency. The diaphragm not only helps respiration but it also assists in returning venous blood to the heart which is a very important factor in endurance. Probably the limiting

factor in endurance isn't ventilation at all; it's the return flow of blood through the lungs, the heart. The circulatory adjustments are a limiting factor and not breathing so in conclusion, you might say that you don't have to worry too much about respiration. You don't coach respiration; that will take care of itself.

(Question) Did I hear you say that the maintenance of pressure, of a rigid chest cavity in the sprint events was desirable? Is that correct? (Morehouse) The maintenance of stability of the chest cage is desirable from a mechanical point of view but in an endurance event, if you start to run with an elevated chest, you limit the excursion of the diaphragm. (Question) Am I quoting Dr. Morehouse correctly that in the sprint events such as the 100 yard dash, contraction of muscles–and I'm thinking of the chest cavity as being included–not related to the activity of running does contribute to better performance? That clenching of the fists, for example, does help you to run faster? (Morehouse) The action of clenching the fists really does not do much good in sprinting, in fact, it may bring about tension which slows speed. Now the act of gripping the fists together or of using these hand-grips is effective in endurance running and is particularly effective in the last portion of the race. The athlete should be told to hold these loosely until the last portion of the race; in the last portion of the race he can begin to grip these hand-grips and use this reinforcement of nerve impulses in order to get more power into the work of the muscles. I certainly would not use them for sprints.

(Cooper) We're going to close with that. There still are a lot of questions but I think we'd better stop. Don't be disturbed at our differences of opinion. We've been doing this for many years so don't let it bother you. Now, Payt, we'll turn the meeting back to you. (Applause).

(Chairman Jordan thanked the speakers for taking their valuable time to appear before the coaches and stressed the value of the experimental approach. He then announced the program for the afternoon session which was to start at 1:30. The meeting adjourned at 12:05.)

THURSDAY AFTERNOON

(Jordan) At this time I'd like to introduce to you a gentleman who has a communication which may be of interest to a number of you, or perhaps a few of you but if any of you are interested, the gentleman I am about to introduce will be available for any information you may want of him later, in the back of the room. Mr. Carey Maupin, personnel officer for the Asia Foundation, would like to say a few words to you, to tell you about some assignments they have in Asian areas which you may be interested in following up. Mr. Maupin.

"Thank you very much. On behalf of the Asia Foundation, I'd like to extend a few words of appreciation to Mr. Ken Doherty, whose kind invitation made it possible for me to be here. Actually he had written to Mr. Harry Stirton of our organization who, I believe, has been in correspondence with several of you. Harry, unfortunately, couldn't be here but he asked me to come and say a few words of thanks to you for your assistance in suggesting people to us in connection with our activities in Sports and Physical Education in the Asian countries. Just a word about the Asia Foundation so you'll know something of what we are. We are a non-profit private American organization concerned primarily with assistance in the developing of democratic institutions in Asia. Within that framework, our representatives in the Asian countries have received a few requests for our assistance in recruiting and sending to them really top-flight leadership in the field of Physical Education and Sports. Now at the present time we are seriously concerned with the recruitment of both a track coach and a basketball coach for an assignment in Burma of probably a year or more duration. I hope you people will give that some consideration. I have Ken's permission to remain on the periphery of your meeting here; I hope you will buttonhole me if you have any interest or can suggest approaches by which we might fill this particular commitment. I think that about covers it, Payton, and I'll certainly be happy to meet and talk with any of you. (Jordan) You'll be available all day today and tomorrow? Yes, I hope so. Thank you very much. Thank you, Mr. Maupin; I'm sure some of the fellows will want to contact you and talk with you about this assignment.

(Jordan) Now it is with a great deal of pleasure that I present to you three gentlemen who have done a great deal for athletics and in other areas of physical conditioning. I would like to introduce first, Dr. Harvey E. Billig of the Billig Clinic here in Los Angeles, graduate of the Cal. Institute of Technology and Stanford University. He has degrees in Mechanical Engineering and from the Stanford Medical School. He was a pathologist at one time at the Stanford Medical School and a resident Surgeon in the Florida Medical Center down in Florida; he did orthopedic work with Long Island College Medical School and Hospital in Brooklyn, N. Y. and spent six years in research in physiology at the California Institute of Technology. He is a Commander in the medical corps of the U. S. Naval Reserve with 4 1/2 years of active duty during World War II as Director of Rehabilitation Research for the Army. He has also been a special consultant to the Los Angeles City Schools in this area. At the present moment, though, Dr. Billig is Professor of Physical Rehabilitation at Pepperdine College in Los Angeles and is Medical

Director of the California Non-profit Medical Corporation, the Billig Clinic for research in the development of rehabilitation methods here in Los Angeles. Dr. Billig will serve as the moderator of the panel and will supervise the discussion. However, I should also like to introduce his two panelists, Dr. William Allen who started out in the State of Indiana where he, of course, was very much interested in Indiana basketball, in fact, he says he was weaned on a basketball. He has not given up his interest in athletics. He was educated at Pepperdine College and the University of Iowa and followed with his medical education at the U. of Louisville in Ky. He followed this with 4 years of association with the Billig Clinic in Los Angeles, and Pepperdine College now has his services as Associate Professor of Physical Education. He spent 2 years in the Medical Dep't. of the U. S. Army in World War II. Last but not least is an old friend of many of us, a man who has been active in training and associated with the Billig Clinic for a number of years. For ten years he was with Los Angeles City College at which time the teams he was training and conditioning and keeping on the field were rated as National Champions in football, basketball, gymnastics and track in the junior college class. He participated for a number of years with the Hollywood Bears, which was a local professional football team in this area and they were rated Pacific Coast Champions in their professional football conference. He is a long-time AAU official and one of the highlights of his career has been as head trainer for the Los Angeles Rams and during his stay with them they won the world's championship. I can say from experience that having watched the Rams many times while he had them, I have seen many, many men stay in the game when they might have been counted out. I look forward with a great deal of enthusiasm to hearing this panel as they present to us their subject, "Conditioning, Stretching and Diet for Athletics", particularly for Track and Field. Dr. Billig, will you take over?

CONDITIONING, STRETCHING AND DIET FOR ATHLETICS

Dr. Harvey E. Billig, Jr., Dr. William L. Allen, and Mr. Dee Jay Archer

(Editor's Note: Because of the extreme length of the following presentation, the material will be summarized when feasible. Verbatim quotations are so indicated.)

Dr. Billig began by pointing out that the basic factors in physical conditioning are the same in all people, whether athletic or not. There is no difference in physical function, the anatomy is the same and there is the same use of physical faculties, whether one climbs a mountain or runs a hurdle race. He then proceeded to an examination of these basic factors with a view to improving them insofar as our present knowledge makes that possible. First he outlined the role played by the ligaments (fascial ligamentous bands) in the mechanical functioning of the body. Stiffness, limitation of the range of activity and the like are due to contraction of the ligaments. This contracting or shortening can be of perfectly natural origin since the fascial attachments have a tendency to shorten after activity when followed by inactivity. We can stiffen up overnight in bed; a chill can cause the ligaments to shorten. In athletes a great amount of training must be undergone before the athlete can function properly, he must stretch, limber up, loosen the ligamentous structures before he is able to perform to capacity. Dr. Billig uses the term "mobilization" to characterize the technique intended to lengthen the ligaments and improve possibility of action. As an example, he cited the ballet or acrobatic dancer who must remain "mobile" at all times and who works constantly at stretching and limbering-up exercises. You can't hurt yourself by stretching too far; the only limitation is how much the ligaments will allow us to move. Shortening of the ligaments will prevent a hurdler from doing a split so that he has to clear the hurdle higher and loses time getting back to the ground. He said that some of our better male ballet dancers could give even our best athletes stiff competition at their own specialties, particularly in the jumping events because of the great mobility they achieve. Of course "mobilization" is not the only factor in performance; some events call for endurance as well, and coordination is always an important factor but it is the weakest link which determines capability. He explained the phenomenon of "tying up", the inability to relax one muscle as its opposite contracts. He advocated stretching exercises as a warmup rather than violent exercise; there is the danger of the pitcher who warms up too much leaving his game in the bull-pen.

(Here Dr. Billig had the coaches line up along the walls and he and his assistants, Dr. Allen and Mr. Archer, had the coaches try some of Dr. Billig's exercises. Since most of the material given is already in print, we will only mention that any one interested can obtain Dr. Billig's booklet, "Mobilization of the Human Body", by writing to The Billig Clinic, 139 South Alvorado St., Los Angeles 4. Afterward the doctor showed a film which demonstrated several of his exercises.)

(Dr. Billig) When your men first come to you after they have been away for the summer, you will find that they have tightened up. We have all noticed that and the first thing to do is to teach them how to do

the stretching. These two that we have showed you today are only two of several. You can have your athlete do a set of these twice a day so that he does from 6 to 15 bends on each side. . . real hard, getting the rhythm of it. . . . Your man will get loosened up very rapidly. With your hurdlers, you can take off several tenths of a second within a week. . . . Remember, he is going to tighten up again. That's what he should do–it's nature's normal process and what we should do then is to loosen him up again by having them do exercises again. Remember the ballet dancer I mentioned; she will get so loose that she can run and do the running splits to the right and do the running splits to the left and she can do it all day long. She's very agile and she has to keep that way and if you talk to one of them you will find that she has to do exercises all her life or she will tighten up."

Dr. Billig then mentioned other situations where the exercises have proved valuable. In a large local creamery, for example, many hours of work had been lost due to disabilities contracted by workers who have to go in and out of cold-rooms. Severe backaches have been cured by this method and in some cases it has even been possible to avoid surgery. His point was that good physical performance, which can be obtained by use of this method, will stand any person in good stead in his job and his daily life. "If you get them loosened up, you'll get better performance. . . . Do as much as you need. Get the boys to do it several periods a day–you don't have to get undressed as we proved here a few minutes ago. . . We will be glad to answer questions as we go along here but right now Dr. Allen has some more factors of physical function that are also important. Dr. Allen."

Dr. Allen began with some general observations on relaxation. . . . "This idea of relaxation I would like to discuss now is important in athletics as well as life in general. We are going to discuss it briefly from the physiological standpoint rather than from the psychological standpoint. . . As Dr. Billig mentioned, the boy who runs 250 yards or 300 yards begins to pile up. One set of muscles begins to pull against the other and it looks as if he has a large load on his back. His legs get heavy and they just drag against each other because they are trying to move one set of muscles that are not relaxed in order to allow the set that is supposed to be working to accomplish their task. The basis of this activity is a long phrase called "Sherrington's reciprocal innervation"; that's a big term for something that is very simple. When we move our arms in this motion, the shortening of the muscle here in the bicep is allowed to take place because the triceps over here doesn't detract against it. Now in the spastic individual you have the fact that the biceps and the triceps want to work at the same time. . . A track man has to run pretty far before he begins to tie up but a spastic individual or an individual with Parkinson's disease begins to have this tremor before activity begins and so we want to try to reestablish the neuro-muscular connection that allows the biceps to contract when you want it to, and to make the triceps relax when you want it to."

Dr. Allen here went into a rather lengthy discussion of the problem of getting the opposing muscles to relax. It is not a matter of motor voluntary control because if it were simply conscious control the condition of spasticity would not exist. The point he makes is that the problem is to educate (or perhaps re-educate) the nerve paths over which the impulses travel. "The mechanism is one in which the brain centers through the medulla of the lower part of the brain receive these impulses and then send them over to the set of muscles that are supposed to relax." The technique is an exercise "which Dr. Billig has described in medical literature as the 'Sherrington reciprocal innervation exercise' ". This is a passive exercise as contrasted with the exercises previously illustrated. "The process is moving the extremity through its range of motion at a very slow rate of speed." The "patient" is to be as relaxed as possible–it would be best if he were able to fall asleep while it is being done–while an operator, perhaps a teammate performed the manipulation. At this point he brought up his colleague, Mr. Archer, to illustrate the exercise, using Dr. Billig's son as a subject.

Mr. Archer, for four years the chief trainer for the Los Angeles Rams, told of an instance in which one of the stretching exercises previously demonstrated had proved of great value. He said that the great improvement in Norman Van Brocklin's punting ability had come about because of these exercises. The stretching permitted an extension of the range of motion so that the punter was able to follow through much more completely than before. Mr. Archer then went on to illustrate the exercise. (Editors' Note: A description of the exercise can be found on pp. 59 and 60 of Dr. Billig's booklet.)

Dr. Allen commented while the exercise was being demonstrated. "I think it's important to notice how slow he's going with this leg; you shouldn't complete the range of motion in less than 10 minutes. Now it's pretty hard to get a young fellow sometimes to sit down for 10 minutes but if you can teach him to relax, it's also a good relaxation exercise for the boy who is tied up. I think it's very important not to go too fast. This is quite demonstrable in persons who have Parkinson's or spasticity because if you go too fast the muscles will jump. . . Go slower and then finally complete this activity so that the leg comes all the way up and then back down to the starting position. Now one of the things in which I use

this a lot for is not necessarily tying up on the field, but in any condition where we have the reciprocal innervation temporarily out of operation because of an injury. . . A boy may be hit by a ball or a bat or in some other way he gets a blow to the muscle. . . It may not cause a lot of swelling–I don't mean the kind where we have a hematoma or a blood clot form on the muscle–I mean a good bump and it feels like it's broken because he can't move his arm. He can't make it move You see this happen to people who will get a blow, for instance, in a fall against the staircase or the edge of the steps. . . and usually it happens in the middle of the muscle, say between the shoulder and the arm, elbow and wrist, not right on the joint. They get a good muscle blow and just can't move. They'll tell you, "I just can't do it. It must be broken. If you run them through this sort of motion you will be able to overcome the spasticity that was set up by the defective mechanism and by the interruption here. . . . Usually one time is enough . . . . It also proves useful in the longer range program of treating those who are muscle-bound and are tie-ups as we say in athletic events. . . The injury problem is one application of it–one time may do it; sometimes it takes more. If the person is injured pretty well it will sometimes take more but in the tying up problem, use this process several times a day if possible, at least twice and maybe three times, the more the better and carried on over a period of time. You can work on it all summer–work on it all during the season."

Here there was a quite lengthy discussion most of which was a repetition of what has been reported. Dr. Billig again stressed that the exercise was a form of education, habitual education of the brain centers and the muscles. He cited the opposing action of the muscles as the reason for pulls and brought in the case of Mel Patton as an example. A question came from the floor about the treatment of muscle pulls. Dr. Billig answered that he used cold applications for the first 24 hours and suggested the slow passive exercise just referred to. "When you try to lift that man's leg later, you are going to have to pull that muscle again in order to get the full motion. You are better off if you go the full motion at the time it is healing. Remember that every muscle in the body is designed to act to the full range. . . Now there is such a thing as going at it too hard. . . When you sprain an ankle and put it in a cast that ankle is going to be tighter and that muscle is going to be tighter and what are you going to do to get that ankle going later on? You have to stretch it until you get it going. It would be better to let that ankle be used with full motion and let it be protected a little bit by strapping. . . . Don't use it too drastically at first and cold applications for the first twenty-four hour period. After that you can start with the heat lamp. Personally I prefer hot wet compresses." Mr. Archer added that there are several devices to be had from athletic supply houses which make good packs, particularly those with thermostatic control. "From my own experience with badly pulled muscles, if they are pulled to any great extent, I figure close to 21 days before we can get them back in action." He then went on to tell of his treatment of a knee injury to Charlie Toogood in which the exercises proved to be successful. He asked Dr. Billig what he thought of having somebody help in the exercise by starting the second leg up when the first leg was coming down. Dr. Billig thought the idea excellent as a time saver.

Again there was some discussion of the exercises. (Dr. Billig) May I give you an example from the field of medicine? An example by a person who was not even a physical education specialist, but was a practical nurse. Sister Elizabeth Kenney went around this country and gave a lot of practical demonstrations on people who thought they were paralyzed from polio and she would pick out the individuals in the ward or people she thought would have good muscle power but couldn't use it. What was wrong was that they had lost their ability to relax one set of muscles in order to pull in the opposite direction and she would pick up their arm and she would give it a very, very slow motion. . . and in just a few minutes she would re-bring to that brain of theirs the ability to know what to do to relax. . . That's why she propagandized so much that it wasn't a loss of power that was bothering so many of these polios, but the contraction in the other direction. Now that is what you get when you tie up; you pull against the wrong muscles–you can't relax one set to go in the opposite direction and you just have to over-force. . . "

(Question from the floor) This has been mentioned in connection with men who have been injured. Is this recommended for all men? Dr. Billig answered in the affirmative recommending the exercise to any man who had a tendency to tie up. "It's a matter of applying the therapeutic exercise in the place where it is needed. It would be a good thing for everyone, I am sure."

It was now 3:30 and Chairman Jordan suggested a short break for refreshments. This was taken and the meeting was resumed at 3:40.

(Chairman Jordan) Gentlemen, may I have your attention. We plan to go on for a half hour or so or until 4:30 and then we will conclude our session. I interrupted Dr. Allen before he had completed the topic he was covering and before we go on to the next subject, he will finish on this fatigue and relaxation factor. But before that, I should like to make two announcements that I think are most important to us. Tomorrow morning at 9 o'clock we will have a session on "Motion Pictures and Their Use in Teaching

and Coaching Track Athletics". I'd like to tell you that we will have in these pictures, among the group that Canham, Doherty and myself have brought together for you, some of the finest films that we could possibly show you. We have pictures of champions in all the events, in very slow motion, in color and also black and white, and I think it would be well worth while to pass on the information to the other coaches who are not here today and whom you may see between now and tomorrow so that they can come and see them. Not only will the pictures be of value, but it will help us to get a full group here for the business meeting. We have a number of things to cover, many of them very important to us as a group and we need a little help to get the whole gang out tomorrow for that meeting. I do think, however, that the pictures will be well worth your while since we have champions not only of the present but from quite a few years back that we can review with great value to us. Now, Dr. Allen, will you proceed with the part that I so rudely interrupted?

(Dr. Allen) . . . The question came up that if we use this exercise for relaxation that we demonstrated and discussed, would the person run forever? Of course not. . . . For the individual who does tie up, it will help his neuro-muscular system work better under the stress and strain of the activity. There are other factors that are involved and this exercise is not an exercise to relieve him of his fatigue. We have another factor–endurance–which we shall discuss in a few minutes and that, I think, will answer the question about using this exercise to make a person run indefinitely and not tie up and never get tired. The person will still get tired and there is the problem of fatigue which this does not help. It just means that it will help the system work better under conditions of stress.

(Question) But how? How does it help? (Dr. Allen) Because it helps re-educate the neuromuscular system through the lower centers of the brain. . . When you do this several times you then help the neuro-muscular system to establish the path more firmly in the brain. That is the mechanism on, I think, the simplest level that I know how to put it. We could discuss this a little farther but I think I have answered your question.

Well, we have discussed so far "Mobilization" and "Relaxation". Now another problem of a separate function which is not necessarily a part of mobilization or relaxation–the problem of coordination. One may affect the other, but coordination is a definite sense of physical function or a definite factor in physical function that we have to work on.

(Editor: Here Dr. Allen goes on to a discussion of coordination which he equates with (1) Balance, and (2) Rhythm. He adduces two sets of examples, neither of which has much application to the healthy, well-conditioned young athletes with which the coaches are concerned.) First, he describes a common phenomenon in children: "Have them close their eyes and bend over and ask them to move around like this with their eyes closed. . . Then we ask them to stand up. About a third of them will come up about like this–a little off center. About a third will be in the center and the rest will be further off. They are badly or poorly coordinated. . . . They don't know where they are. They don't know whether they are straight or not. They may be over this way and yet their proprioceptive (?) centers did not do enough to tell them that they need to straighten up a little more. Their sense of coordination, their sense of balance is poor. . ." Second, he described another phenomenon wherein, because of "certain diseases, for instance, people don't know where their body parts are. . . There are certain nervous diseases where parts of the spinal cord to which the particular nerve fibres that tell us where our body parts are, are interrupted–these fibres are interrupted–and when they are interrupted the person doesn't know where his hand is, whether his palm is up or down. . . Now there are gradations to this so that we find some people who are highly developed in their sense of rhythm or balance. They know where their body parts are. They can handle them well. We recognize it and say, "Well, he's got good coordination. And then we see another person who is awkward or clumsy. We see another whose one shoulder is always down . . . his nervous system is off–he doesn't know where his body parts are. It's that sort of thing we are talking about in coordination. Why? Because it is this mechanism that allows the individual to act rhythmically and with good coordination. . . . There are things that can be done to enhance that ability so that he will be able to act with more coordination and, if he has better coordination, he can do his task, no matter what his task is, more efficiently."

(Dr. Billig) I just wanted to bring out a point for clarification. Every horse has to undergo a period of training. He is exercised by an ex-jockey who is called an exercise boy and he is an exercise boy because he has a very highly developed sense of timing. This is the type of person who knows that he runs the first 440–say he is attempting to run a 4-minute mile–he knows that he ran it in say 59.5. He can tell you that close. And he can tell you at the end of the 880 that he has run it in 2:01 or whatever he ran it in. (Dr. Allen goes on to talk about the feeling of pace in a horse or a runner and then of the sense of timing which a boxer seeks to develop, considering both as phases of coordination.)

(Dr. Allen) The mechanism of improving the coordination of the individual, whether he already has a

good degree of it or not, is through rhythmic exercises. The rhythmic exercises must be just that. They must be rhythmic and not dis-rhythmic or jerky movements. They should be smooth, as we say, coordinated or rhythmic exercise set to a set pattern and the pattern must be an exact one. . . . The exercise can be varied or diversified. Dr. Billig has given some good examples that are used in some sports to do that (a boxer punching the bag or doing road-work). It's good for track men too, in a sense, because they can get a good sense of rhythm by jumping rope, for example. (He goes on to suggest exercise to rhythmic music and cites the use of music in swimming as an example.)

Dr. Billig rose to tell of the tremendous success a friend of his had had in coaching swimmers to music. He also mentioned the fact that it seemed to him that a strong sense of rhythm seems to be characteristic of many members of the Negro race and suggested that that might have something to do with their success in athletics. In working with children, rhythmic exercise is of great value. He said that if one works with youngsters shortly after birth "you can develop their coordination so rapidly at that age that they will be walking in five months. Any baby can be walking in five months if you just give them lots of rhythm exercises. Phonograph records will give you exact rhythm, or a metronome, for that matter. We have done that a number of times just to bring the illustration home just how tremendously important a sense of coordination is. . ." Here he went on to review briefly what had been covered. . . "Pick out the factors your boys are more deficient in. If their tendons get too tight, give them a lot of stretching exercises. If they can't relax, give them a lot of relaxation exercises which we told you about. If they don't coordinate, give them rhythm exercises. Have them jump rope. And now, Dr. Allen, will you talk about endurance?"

(Dr. Allen) That brings us to the topic of endurance which is so necessary to the track man. Particularly distance runners–unless they have a lot of endurance they won't be able to keep going; they'll fade out and get too tired so endurance is one of the factors we have listed here. Endurance is developed by fast, repetitive exercises over a short period of time. Fast motion against a resistance. Fast motion in a rhythmic pattern will develop endurance and coordination at the same time. Regardless of the distance to be run, wind sprints will build up endurance. . . We mean running as fast as he can for a short distance. Although the mechanism of the development of endurance is not exactly known, we do know that the first thing to give out–the first thing that happens when a man gets tired is that his nerves are unable to transmit the impulse to the muscles. . . He must be able to utilize all the neuro-muscular activity and help the blood-vascular system to fulfill its function in bringing fresh oxygen to the muscles and more particularly to get the neuro-muscular system to work under the stress of an all-out effort. This will help them to be able to last longer in whatever activity they undertake.

(Question) In doing wind-sprints, do you jog between wind-sprints? (Answer by Dr. Allen) They can do anything. Lie down and rest if they want to. It doesn't make any difference, walk or anything else but in doing the wind-sprints, it's not a half-hearted effort. They should use every ounce of energy they have. Sometimes a hundred yards may be too much, particularly at first; sometimes fifty will seen too long but then have them run even 25 yards, then increase the distance. Have them do it for 30 or 40 minutes. It will increase their endurance so that they can sustain the effort longer. (Question) Do you try to reduce the recovery period at all? (Answer) Not necessarily. It will do it by itself. . . . Now if we add a resistance to this or to any other muscular activity, we then help to increase power. . . You have to look at the form of activity to see what the man needs most, whether it is power, or coordination, or what combination of factors. . . I think it has been pretty well established that we help develop power by making a maximum contraction against resistance. . . Time is running out and I'd like to bring up one more factor and that is the matter of Nutrition, which is a factor of physical function.

The essence of the nutrition factor is to create a positive nitrogen balance and provide all of the proteins that are necessary for the activity. . . We have to have the proteins metabolism, the process of the proteins being burned up or utilized for the process of making the nerves transmit the impulse to the muscles so that they will contract. . . I'd like to have Dr. Billig report further on this because he has developed a diet program and he can tell you how it will work for athletes, taking off or putting on weight and giving them more energy. Dr. Billig.

Dr. Billig called attention to a diet sheet which he had passed out among the coaches, a diet to be followed either at the training table or by the athletes at home. On the "may have" list are the proteins and the fats which may be eaten. On the "avoid" list are all the carbohydrates and starches. . . "You'll find that the Eskimo never got fat because they never ate any carbohydrates. He had the proper balance of protein and fat. Too much carbohydrates stimulate the pancreas to manufacture too much insulin. . . The foods on the "avoid" list are those that overstimulate the pancreas and cause it to manufacture too much insulin. That is the secret, whether the foods you eat goes into proteins or energy, or is going into fat. . . The food proteins on the "may have" list turns into carbohydrates, but only when burned, not into

the blood stream and to the pancreas. It serves to create energy, not just fat whereas the carbohydrates circulate in the blood stream on the way from your gut and stimulates the pancreas. Some people don't respond in that way but that isn't true of most people. . . I'd like to recommend that you buy two or three barrels of calcium lactate. Calcium lactate is a very absorbable calcium compared with all the others . . . Take it the first thing in the morning with grapefruit juice. . ."

There was a question about fungus infections such as jock-strap itch or athlete's foot. Dr. Billig had two suggestions: first, sodium thiosulfate. "Put a few tablespoons full in a pan of water every day and let the boys stand in it while they are drying off from their shower and the athlete's foot will disappear. The other remedy is Desenes, which can be purchased in the drug store as a powder or as a salve in a tube. Just apply to the parts affected and the fungus disease will clear up. You'll like this diet but stay strictly off the "avoid" list. They can eat all they want as often as they want of whatever they want on the "may have" list. The question was asked why orange juice was on the "avoid" list. The answer was because it contains so much sugar. Grapefruit juice does not contain as much. There was a question here about the use of calcium; Dr. Billig said that it's action was quite rapid. Another question concerned the Nutty Brown Bread on the recommended diet list. Dr. Billig answered that it was produced in Cedar Valley, Texas from cotton-seed flour. "It is very tasty and rich in protein. . .Toasting will not change bread; it's still carbohydrate. . . Cheese is one of the best foods. Eat all you want."

(Chairman Jordan) May I on behalf of the group here thank you, Dr. Billig, Dr. Allen and Dee Archer, thank you very much for this wonderful presentation. (Applause) Don't forget tomorrow at 9 o'clock and the business meeting at 10:15. Tonight the coaches' dinner at the University Club at 6 P. M. Thanks a lot.

THURSDAY EVENING, JUNE 16.

The coaches and officials began to assemble at the University Club shortly after 6 o'clock. After refreshments were served in the patio, the guests sat down to dinner at 6:15. Prof. Hunter called the meeting to order exactly one hour later.

Mr. Hunter extended a cordial welcome to all the coaches, officials and guests. He then introduced the men at the speakers' table, Commissioners Kenneth "Tug" Wilson of the Big 10 and Victor Schmidt of the PCC, Coaches Ken Doherty, Jim Kelly and Jess Mortensen, H. D. Thoreau, Walter Byers of the NCAA and Wilbur Johns. He announced that the meet would be televised for the first time and that the television people had asked that the meet be moved up so that outstanding races might be included in the telecast. He also said that the meet would be timed by a new Longines timer and camera. After a few instructions to the coaches, he introduced Brutus Hamilton as chairman of the Rules Committee.

Mr. Hamilton expressed thanks to the University of Southern California for its hospitality and congratulated the University on its 75th birthday. The Rules Comittee, after two days of deliberation had recommended some minor changes only one of which applied directly to this meet. This change has to do with the prohibition of the use of a harness in the shot put and a clarification of the taping rule. The rule (No. 31 Sec. 6) now reads as follows:

> "The use of a harness or any mechanical device attached to the hand or arm shall not be allowed. Taping the wrist, palmor back of the hand and fingers is permitted; provided not more than two fingers may be taped, and they must be adjoining fingers only. There shall be no connecting tape, device or covering between the fingers and the palm or back of the hand; between the wrist and palm or back of the hand; nor between the fingers and wrist."

Mr. Hamilton asked the cooperation of the coaches who have pole vaulters in having their men ready so that the event would not drag out after the rest of the meet was over. As to next year's meet, it being an Olympic year, the meet will be a semi-final tryout; the distances would be metric and the program would include all the Olympic events.

Mr. Hunter then introduced the President of the Tournament of Roses who briefly presented his officers and staff members.

At 8:45 the officials withdrew and Ken Doherty took the floor to explain the procedure of the drawings. He said there had been a great deal of dissatisfaction with the length of time it took to complete the drawings. He had therefore suggested to Mr. Hunter that the latter appoint a committee to expedite the drawings; that H. D. Thoreau prepare lists of past performances upon which the committee could base the seeding and placing in heats, all subject to the approval of the coaches. It was emphasized that final control was to remain with the coaches. He said that this method would save a great deal of time since the committee could arrange the heats while the scratches were being made in other events. Coach Doherty moved approval, it was seconded and passed.

Coaches Hamilton and Doherty were named to the committee with H. D. Thoreau in charge. The drawings went very smoothly with a minimum of objections. The work was finished at 10:07 thus establisting the first record of the meet.

President Doherty of the NCTCA announce the Coaches' Clinic to be held the following morning (stressing the use of loop films, etc.) and the business meeting to follow. The meeting adjourned at 10:10.

FRIDAY MORNING, JUNE 17.

Chairman Jordan called the meeting to order at 9:15. He spoke of the increasing popularity of films as a teaching and coaching aid. Ken Doherty, Don Canham and he had been talking about films and had agreed to collaborate in presenting them at one of the clinic sessions. Don, however, had begged off on the ground that he had already presented films several times before the same group. Ken had brought some very fine pictures along and they hoped that the presentation would be both entertaining and instructive.

(Chairman Jordan) I don't think I have to say much about emphasizing film as a valuable aid to both coaches and athletes and in helping our boys to adopt the best methods and techniques that are being used today. Naturally, I'd be foolish to say that the champion is the only one to copy because there are thousands of ways to perform any action but a champion usually has a reason for being a champion. However, there are certain basic concepts and it is in these champions that you'll find these concepts or fundamentals that we should recognize and try to work with. So in looking at the film, I hope you will keep in mind that there is no intention of being dogmatic or of implying that this is the only way to do it. This is only a starting point and it is possible that you have boys much better than some of those we are going to show you. In each of the films I'm going to show you this morning, the athletes are champions, Olympic or world's record holders in each case, some of them with personal techniques, others with the basic techniques we have seen over a number of years. We're going to emphasize as much as we can film usage, the utilization of the film as an aid rather than the individual techniques of the athletes. The use of films can be developed in several different areas, in the entertainment phase, for example, which at the same time can stimulate the blood so that the persons watching will feel the desire to go out and work harder where they have showed only a moderate interest up to this time. Then too, when they see how the other boys do it, they start comparing themselves as champions. It gives them the idea that "You can do it if the other boy managed it by hard work and by using the same techniques they have used." We feel that film is the quickest way to teach, a lot better than words and better than demonstration. Most of us are getting too old, or never could, or aren't particularly good at doing what we think the great athletes should do. However, when we can take the great athletes of the present time and show them to your young athlete, even if he is a finished product there is a very good chance that we can establish a common ground between the picture and the athlete.

(He then went on to tell of the various methods of presenting the films, e. g.,) "the Spectro projector which shows a frame at a time and which Ken Doherty and Don Canham have. The one at Ann Arbor which most of you saw, is a very outstanding machine though a difficult machine to get parts for in the U. S. It does an excellent job, however. There is also the Animatic which is made here in Los Angeles which many of the schools on the coast have and which I've seen in other parts of the country as well. I'm mentioning it because it is made in the U. S. and we can get faster service if we need parts for it. It is a one-click projector. There are now two types, the A and the B type; in the B type you can press a button and keep it going but if you want to show just a frame at a time you can do that also. It runs from $181 to $187, more reasonable, I believe than the Spectro by $30 or more. It's not very cumbersome; there's one on the table back there and you can see it's not too difficult to take around with you. I've found it very useful particularly in clinics and instruction sessions in my home area at school. We are using this in combination now, the click projection along with the 16 mm and the reason I like this–and I'm presenting this just as a personal opinion–I like to put the loop film on a 16 mm projector and just let it go until the boy sees something that he's concerned about and then have him tell me and we stop right there and go over to the click projector and go over it step by step with the click projector to show him what his problem is or to answer his question if he has one. Also if you can get enough money, get a second machine and show the champion on one and your own boy on the other. We have done that to a certain degree although we have not been able to get another Animatic. We've taken pictures of our boys at various stages of their progress during the season and have shown them to the boy saying, "Now compare yourself with the champ and see if you can get any ideas about your own technique in comparison with the champ". We warn him, however, not to try to copy the champ verbatim because you can't get away with that as a rule. . . We've had particularly success with one of our boys, who has copied O'Brien's style in the shot put about as well as anybody. He weights around 215 pounds and for his size,

I think he is using the form very well. He has done 57 ft. 2 1/2 inches and I don't think there is anyone who copies him closer than this kid of mine. . . We've found that taking these films in color has a lot better effect than black and white. . . The boys seem to be a little more alert in regard to the color pictures as against the black and white. I think that it is a part of the psychology of the film in my mind in providing a background as realistic as the conditions in which they are going to compete. I think, for example, that in practice sessions, the throwing areas should be in as good condition as those where the meet is to be held. By the same token, what they see in the films should be normal compared with what they have been doing or will have to do in the future.

The films, these 16 mm movies, are very easy to get. These come from various areas; you can make them yourselves, there's no reason for buying them although both Don and I are marketing them. Buying them is a good thing if you want to get them quickly and easily, but I think you can use your own boys who are doing well. You don't have to buy them; you can use your own examples and you can get examples from other coaches by exchange. . . Then there are other places to get films, the Encyclopedia Britannica and the AAU, of course, and there are various other agencies. I personally got into the film business because the films I saw, the Encyclopedia Britannica and others, didn't seem to have enough continuity, didn't have enough light and didn't show me what I had hoped to see so I didn't want to buy them. It was my feeling that when you do something, do it in small lots; don't try to make a big production out of it; try to do it in a short sequence to show particularly what you're trying to do in terms of your coaching and teaching.

Just to evaluate briefly, I think that the production film does a lot of good but as far as learning is concerned, I don't know if they get a great deal of good out of it. It has to be more pin-pointed and more definite, that is, from the standpoint of coaching. They will pick up some things, of course, but it is my feeling that the loop film is as good as anything we have for actually showing in a lifelike manner the things we're trying to teach and coach. True, there may be an error here or there, but nothing is perfect and even our greatest champions make mistakes. So I don't feel too bad that loop films or any other films do not present 100% perfection. I do think that we have a very powerful and very inspirational coaching aid in loop films. I personally like loop films better than any other coaching device I have seen.

Now I'm going to move from my present position and will take my place behind you. First I'm going to demonstrate the use of loop film and we'll assume that at a certain spot in the film somebody says, "Coach, what's that fellow doing there?" We'll stop and go over it in the Animatic and we'll talk for a minute at that stage with the stop-stop-stop. Then we'll go back to continuous action which gives you both stop and continuation; we know that movement is more important than standing still, particularly in track so we want to keep it moving. But we also want to be able to stop so that the kids can see what's wrong or what to do about their own particular problem."

The first film shown was one of Parry O'Brien and Tom Meyer spliced together in one continuous loop for purposes of comparison. Jordan pointed out several faults of Meyer's and told how study of the film had benefitted him. He pointed out the difference in the placement of the back foot, O'Brien's straight back and Meyer's not so much so. He stopped the film at one point and went over to the Animatic. "Suppose your boy wanted to see O'Brien's starting position, wanted to see that back foot." Here he discussed the minute details of O'Brien's form. He suggested to the coaches that they try the same stunt, to splice a picture of their boy into one loop with the picture of the champion whose form he was trying to approximate. He pointed out that you can reverse the film on the Spectro but not on the Animatic projector.

(Jordan) I didn't want to take up too much time with this; I just wanted to show you some of the possibilities of the use of loop films. If there are any questions, I'll try to answer them as best I can. Now the next film we're going to show is one that Ken brought, a number of champions in the javelin throw. Thank you very much for your attention and I hope I have brought up a few things which may be of use to you. (Applause).

(Don Canham) There are two things I'd like to mention. First you can get back film copies of NCAA meets from Walt Byers in the Fairfax Building in Kansas City. Some of us may not have known that these films are available. Another thing, if cost is an important factor, you can save at least half by using 8 mm film." There were some comments made here on projectors, again that the parts for the Spectro were difficult to get and that it was not too well made as well as somewhat expensive but Canham thought it gave a sharper picture than the Animatic. He also mentioned the fact that Bud Winter at Jan Jose had successfully used two projectors simultaneously. Other possibilities were to reverse the film and make a left-handed pole-vaulter out of Warmerdam or a left-handed shot-putter out of O'Brien. The Animatic (in answer to a question) is made by the Dunning Color Corp., LaBrea Ave., Hollywood, Calif.

(Jordan) This doesn't take a reel; it takes strips and the cost of the model I have here, the "A"

projector, is $181 and the "B" model, which is a better one, is about $221. I've been asked how you store the films. Well, I keep the 100 foot reels in cans and they don't kink or bend there. In anything else, they may kink. However, if you can do it, the best way is to put a few pegs on a closet door in your office and hang the film there when you use it frequently during the season. That's better than putting them in and taking them out of a can. After the season I would put them in a can or a humidor type container. Any questions? If there are no more, we'll go into your film, Ken.

(Ken Doherty) Just a comment on this film. The major part of it, about 350 feet, was gotten together by Frank Wetzler, the coach at LaSalle College in Philadelphia, on Al Cantello, his javelin thrower, who has thrown around 225 or 230 feet. Wetzler has been eating and sleeping "javelin" for the past three years; he's really a bug on the subject and he's been trying to do the best possible job in teaching Al the best possible form. He put together this film for the purpose of helping Al Cantello, his own man but now he's thinking in terms of helping other men. . . I have included here a series of pictures on the javelin which I had, one of Cantello in the IC4A games, a series I took in the Coliseum a few years ago of Held, Miller and Young. The last picture I have of Held, in color, by the way, was a throw of 261 feet, and then some pictures of Rautavaara and Hytiaanen of Finland in the '52 Olympics and of Held in the '52 Olympics. We'll just run this first part through without comment. . .

I was fortunate in having been to several clinics; one was in Toronto where Brutus Hamilton and I were together for a week with men in all grades of ability–the best men in Canada and the rank novice–and then going over to India for two months where again in one sense we had the best and the poorest. On the basis of our experience in these two instances, where you were trying to teach as much as you could in a very short period of time, in the future if we were running the clinic, I think we would have something different. This is by way of introduction to what we have. The first thing we would do in teaching the discus, for example, would be to get as many discuses as we could–or some other object that felt like a discus–and get the men on the field in groups of six, eight, ten or a dozen–perhaps three groups. One group would be working with the shot, one the high jump, one the discus, and getting them to feel that piece of wood or that discus that was in their hands and to roll it on the ground or maybe toss it in the air. We did this in India–or rather the Indian coach did this–and gave them the feeling of what a discus is and what it is all about. They would take a turn, in groups, and let the discus go in any direction, one throw just to get the feel of the thing. We would spend fifteen minutes, not more than a half hour, on that and then we would come into the lecture room and go over this 50 feet or 75 feet of film two or three times so that again they would get the feeling of what the champion does. Then you go to the lecturer's room and talk for whatever length of time you had–45 minutes would be about the limit–giving them the fundamentals and anything you wished to say and near the close of that period running the loop films and showing in detail what Consolini, what Iness, what Gordien did, and so on. Then in the afternoon going back on the field and again getting the feel of performance in the event, giving them a muscular feeling for the event. . . We were fortunate that it was an excellent way of teaching as much as you could in the least possible time. So, in order to do that, we had two copies of the same material; first, this reel you are going to see, about 400 feet which is all these loop films of all the events tied together in one single reel and we presented this to them at the beginning of our clinic. And so we would run over perhaps 6 examples of the shot or the discus, and in addition you would have the loop films–we carried them in a little canvas bag–these loop films which we would show individually. In this reel–I'll mention this because things happen in a hurry–the loop films in slow motion make a better picture. There is a shot of Fonville here, for example, and it's here and it's gone and you don't know what happens but on a loop film it is slowed down and you really get a useful picture. It begins with the shot put; it starts with Jack Torrance, Parry O'Brien two shots; about four of Fuchs and a very quick one of Fonville. Then it goes to the discus; quite a few shots of Iness, three or four of Consolini, two of Gordien, one of Emery, the big colored thrower we had at Pennsylvania for one year. (He here discusses an element of Emery's form to which he directs the coaches' attention.) He was only able to do it for about one month and that is, at all times during the turn, he keeps his head back there until the last minute and then pulls it away from there which in a sense, is comparable to what Parry O'Brien does in the shot pulling all the way from here. Then Vic Frank, 170 pounds, 174 feet; there are two shots of him. In the high jump, Ernie Shelton, Willie Lee of Penn. in the IC4A and in practice, Albritton, Walt Davis and Shankle of Duke, taken in the IC4A. I'll call the names as we go through. . . .

After the films were shown, Chairman Jordan called for a five minute break at 10:25.

BUSINESS MEETING OF THE NCTCA, FRIDAY JUNE 17.

President Doherty called the meeting to order at 10:35. After his preliminary remarks, his greeting to the coaches, an announcement on the availability of tickets, etc., he proceeded as follows:

We are all aware that everyone is anxious to get out of here as fast as he can but we can't tell how long this meeting will take. It will depend, of course, on the extent of the discussions we get into on various motions. The Executive Committee has prepared an agenda which covers the topics we know of, the business we had in mind but I am not aware of what new business might be brought up by you men from the floor. However, we'll move along as fast as we can. The matters which might be considered more important and which might involve lengthy discussion have been left to the latter end of the meeting so I hope that you can all stay until adjournment.

We will dispense with the reading of the minutes of our last meeting. They have all been printed and have been mailed to you so assuming there are no objections from the floor, they will be considered approved as mailed out to you. Some of you may not be aware of the fact that we have a recording secretary. His job is not covered by the constitution so it is not exactly clear as to what his duties are but that will develop as the years go by. At the present time it seems clear that it is his job to take notes at our business meetings and to handle all clinic notes. (He then went on to praise the job that had been done on last year's Clinic Notes and to express the thanks of the group.) Phil, will you give your report as Recording Secretary?

Phil Diamond spoke briefly on the division of labor between the two secretaries. Since the work had grown to a point where it was difficult for one secretary, particularly if he was a working coach, to handle, the attempt had been made to separate the secretary's job from the treasurer's. This had not proved feasible since much of the secretary's work has to do with financial matters. The present arrangement, whereby the major portion of the work still remains with the Secretary-Treasurer but whereby he receives some relief in the handling of the minutes and the Clinic Notes, seems to be working out satisfactorily. He also said that he had reproduced the Clinic proceedings verbatim where panel discussions were involved because he thought the question and answer portions of equal importance with the set talks in showing the trend of the coaches' thinking in the various events. He concluded by asking for suggestions on improving the published Notes.

(Doherty) Thanks, Phil. Now we'll have the report of the Secretary-Treasurer.

(Fran Dittrich) The financial report for 1954-55 shows that we have 187 actual members who paid $5 each, making a total of $935. This compares with 120 members in 1953-54. We also have 117 associate members at $3, making a total of $351. Last year we had 63 such members. From the sale of Clinic Notes and All-American certificates, we received $53.75, making a total income of $1339.75. Disbursements for the year were $1310.33 and the bank balance as of June 11, 1955 was $29.42. On the 15th of June I received from Bill Easton a check for $186.19 and also two additional payments for All-American certificates totalling $12.00. This makes a total balance on hand as of today, $227.61. I also have on hand 100 copies of the Clinic Notes which I shall be glad to sell to anyone for $1.50 per copy.

(Doherty) Thank you, Fran. This report has been checked by the Auditing Committee with Carl Olson as Chairman. The Chair will recognize a motion that the report be accepted. Seconded and passed.

We shall return now to committee reports. Some of you may not be aware of the fact that for many years there has been in existence a Committee on the standardization of rules, the purpose of which, as I understand it, is to bring under a single set of rules all colleges throughout the United States. As you know, the IC4A has for many years published its own book which has differed in some details had in some points of view from the National Collegiate. Throughout the years, Chic Werner has been very active on this committee. It has been what you might call a standing committee though they haven't exactly been standing around. They have been working patiently and gradually and I'd like to hear their report at this time. I think we have finally reached a point of definite success.

Werner reported on the progress of the Committee on the standardization of rules. It was a standing committee, semi-permanent, with the objective of getting the Track and Field rules down to one rule book, conforming as closely as possible with the international rules. The latest achievement of the committee has been to get the IC4A rules to conform with the National Collegiate. The committee has not held meetings but has been acting in "an underhanded manner". He said that he (Werner) had been the dormant chairman of the dormant committee which now had no need for meetings since their work seems to be progressing satisfactorily.

(Doherty) Thanks, Chic. There has been an informal committee working on the matter of honorary membership certificates set up in our by-laws and instituted three years ago, in 1953. These certificates were to be given to those men who retired on the job and head Olympic coaches. At our Executive Committee meeting on Wednesday, the following names were suggested. This is not necessarily a complete list; additional names from the floor will be welcome. (The list of names included Hec Edmundson of Washington, Ed Weir of Nebraska, Ralph Young of Michigan State and Matty Geis of Princeton.) There was some discussion in our Committee meeting relative to Ralph Young. The statement in the by-laws

reads "to coaches who retire on the job". In Ralph's case, he was active for many, many years in coaching; he retired as track coach to become athletic director and since then has retired as athletic director. The Committee felt he was fully qualified even though he did not fulfill the letter of the wording. Are there any other nominations?" Brutus Hamilton's name was suggested. Holmes mentioned George Gauthier of Ohio Wesleyan. Rider mentioned Walter Livingston of Denison. Canham thought the qualifications were too narrow; they should be broadened to include others who have contributed substantially to the sport. The nominees were voted on separately. The complete list of those who were named to receive certificates is as follows: Hec Edmundson, Ed Weir, Ralph Young, Matty Geis, Brutus Hamilton, George Gauthier, Walter J. Livingston and Garfield "Doc" Weede of Kansas State Teachers. The names were individually approved.

(Doherty) Under old business, we have two items on the agenda. First a brief comment on the mid-winter clinics which were on the edge of being abandoned two years ago but which were held at Cincinnati a year ago last January and again in New York this past January. It was the concensus of those who attended those clinics that they were extremely valuable in the area in which they were held. At Cincinnati, for example, there were approximately 150 coaches from colleges and particularly from high schools from eleven states. There was no official NCTCA meeting of any kind. It was a clinic conducted under the auspices of the NCTCA for the benefit of whatever coaches could attend. The same thing occurred in New York City. The men we secured were of the highest quality; we had Frank Ryan, the shot-putter who is now a psychologist at Yale University and we had Dr. Ernst Jokl of Germany, South Africa and the University of Kentucky, who has made marvelous studies in the area of physiology. I think every one was certain in his mind that those clinics were worth while and should be continued. In order for us to continue them in this next winter of 1956, I think it is necessary that a motion be made from the floor. The winter meeting will be held in Los Angeles and our guess is that the outdoor Intercollegiate will also be held on the west coast. This probably means that there will be two sessions then of the clinics, the first in January, and the other in June, both somewhere here on the west coast. Our next vice-president will be in charge of both meetings. Is there such a motion? (Littlefield moved, Schlademan seconded and the motion was passed.)

The next item has to do with the fees for the NCTCA. We all realize that we have a problem relative to finances. There are many things we would like to do but cannot do because of lack of finances. Our Executive Committee tossed it back and forth for about a half hour the other day. They are aware that you spent a lot of time a year ago on the same subject, that there were four motions made, all of which failed to carry. The final decision was to continue on the same basis of asking $3 for associate memberships and $5 for regular memberships. I should like to hear the comments of the Treasurer relative to the Executive Committee meeting and its recommendation.

(Dittrich) I have here a little study on the cost of printing and the general miscellaneous expenses of the Association. Last year, as you will recall, the subscription price of the Track and Field News went up from $1.50 to $2.25 which means that we paid out $2.25 out of every five dollar regular membership and every three dollar associate membership for Track and Field News alone. The printing of the Clinic Notes came to 87 cents per copy. This could be more this year if there is an increase in bulk. The same goes for the mailing which last year came to 7 cents per copy. Miscellaneous expense, mailing costs, etc. came to about ten cents per member making a total of $3.29--and this is a minimum figure--per member. I would like to recommend at this time that we raise the active member fee to $6 and the associates to $4." The president asked for a motion; Bill Easton moved and Alec Wilson seconded and the motion carried. Snyder suggested that letters be written to the associate members informing them of the increase in dues.

Here a point was made from the floor that the problem of dues should have come up under new business. The President pleaded guilty to mis-reading his notes and admitted that the matter of fees pertained to cross-country as discussed at the meeting last June. He then asked Karl Schlademan to report on the matter.

Coach Schlademan (Michigan State University) reported that he had met with the NCAA Committee and had placed before them the recommendation that an entry fee of $2 per man be assessed. He said that the NCAA pays the host institution $750 for running the meet and in return, receives the $2 entry fees so that the entire cost to the NCAA would be about $350. Michigan State, he said, spends about $1500 on the meet for coaches' dinners, clerical help, etc. Wilson asked if the assessment of the fee had limited entries in any way. Schlademan answered that the fee actually helped the meet, that it cut down indiscriminate entries and improved the meet in that way.

(Doherty) Any other old business? There are still a few items to take care of before we move on to new business. Here is something from the Public Relations Committee of the National Collegiate Athletic

Association; I understand that George Rider has been asked to represent that committee at our meeting here. George, will you report at this time?

Rider told about the formation of the national committee, its purpose being to do something constructive in counter-acting the frequent bad publicity which collegiate athletics has received. After working on the problem for more than a year, the committee came out with a brochure outlining what is being done and what should be done to improve public relations. Every athletic director whose institution is a member of the NCAA has received a copy and all the coaches should have received them also. (On question, it appeared that only two of the coaches present had copies.) "If you will write to Walt Byers I'm sure you will get one; there are copies available and everyone should have one. Now I'm going to ask to have the entire outline of the program put into the minutes of this meeting but I'd like to make a few remarks first. The reason for this effort is our feeling that there has been a decline in public confidence in some of our athletic activities. You read the papers and you almost always read headlines about so-and-so said this-something detrimental to sports-and it seemed to us that somebody ought to do something to let the people know that intercollegiate athletics are still good for the boys, to counteract some of the bad publicity by pointing out some of the things that are worthwhile in our program. It seemed to us that our fights and arguments, about eligibility etc., could be handled quietly, within the institution, and not make headlines. We would perhaps do well to spend our time telling some of the good things that athletics have done and are doing."

OUTLINE OF THE NCAA PUBLIC RELATIONS PROGRAM AND THE PLACE OF COACHES' GROUPS IN ADVANCING THAT PROGRAM

The NCAA, on behalf of intercollegiate athletics generally, has launched a new program in the area of public relations which is of special interest to all college coaches.

This effort stemmed at the outset from a sense, felt by many, of declining public confidence in the purposes and integrity of intercollegiate athletics, together with a desire to re-state firmly and clearly the distinctive characteristics of amateur athletics-intercollegiate athletics in particular, and their essentiality.

There followed a determination by the officers of the NCAA to employ the vast and influential resources of the colleges which are members of the NCAA, together with their staffs, in behalf of a positive, dynamic public relations program. The objectives of this program have been stated as follows:

1. Constant review and evaluation of intercollegiate athletics as an expression of and an important contribution to the American way of life.
2. Development of a proper perspective of athletic competition by everyone participating in the athletic program.
3. Emphasis on the advantages of competitive athletics to the individual, his institution and his community.
4. Support of the press and other media of communications in carrying out an intercollegiate athletic program.
5. Foster and maintain the positive support of the public toward the continuance and further development of intercollegiate athletics and an appreciation of its purposes and objectives.

The program is being organized and directed by a special NCAA Public Relations Committee whose chairman is H. P. Everest, Vice President of the University of Washington and which includes in its membership representatives of faculties, athletic directors, coaches, Conference Commissioners, and athletic publicity directors. This committee has adopted certain operating procedures and has undertaken implementing projects of which the most important at this time is a Manual setting forth a pattern of source material, a summarization of aims and objectives of intercollegiate athletics, and a listing of objectives and operating techniques in the field of public relations.

The dominating philosophy of the Public Relations Committee is that the purposes of the program will be best served by enlisting the support and active participation of all individuals who are concerned with the welfare of intercollegiate athletics.

In that respect, the entire program places special emphasis upon the coaches of intercollegiate athletics. This is so because the individual coach not only has the responsibility of administering the intercollegiate athletic program at its tap roots in a manner which gives intercollegiate athletics its base, but he is also the most prominent public representative of that program and accordingly its most powerful voice with the public.

It is the desire of the NCAA Public Relations Committee to place this general outline of its program before the coaches in all sports and to urge them, individually and in their Associations, to

participate actively and forcefully in a positive presentation of the unparalleled virtues of intercollegiate athletics.

To that end we suggest special reference to the Manual which is available to if not already in the hands of each head coach in NCAA member institutions, as an operating guide. We also suggest that each coaches' association organize its own public relations committee if it does not already have one, to provide stimulus and direction to the individual coaches in this area and to provide an avenue of liaison with the NCAA program and its Public Relations Committee.

Mainly, however, the Committee desires to affirm the vital and, in fact, indispensable function of the individual coach and the coaches' associations, and to appeal for their active support of the program in accordance with the overall objectives which have been set forth here together with such other devices as they may find it within their power to bring to bear. (End of inserted statement) (Rider)

Now I would like to close these remarks by pointing out the suggestion which came from our committee; you will find it in the second last paragraph of the outline. The suggestion is that each of our coaches' associations appoint a committee, a Public Relations Committee, to work as a liaison group with the parent committee of the NCAA. If, for example, our association finds something that is important, it would perhaps submit it to the parent committee which is made up of men from all parts of the country and in all the various phases, athletic director, faculty representatives, coaches, and so on. When it is turned over to this committee, it will in turn be added to this brochure. It's a looseleaf affair and whenever anything worth while comes in, it will be sent to Walt Byers' office and sent out to every institution to further the whole public relations program. So I would like to make a motion, if this is the proper time, Mr. President, that our association elect or appoint a public relations committee of our association to serve as a liaison group with the National Collegiate parent committee.

(Doherty) Could you state your motion just a little differently? I am thinking of the matter that is to be brought up next, a possible revision of our constitution and by-laws, so that it will be considered in connection with the appointment of committees for next year. (Rider) I shall be glad to change the motion. (Doherty) Is that point clear? I will shortly take up the matter of the revision of the constitution and I think that should be considered in the appointment of committees.

The motion was seconded and passed.

(Doherty) We have a second and somewhat related statement here from the National Collegiate offices, apparently sent out by Walt Byers to all associations. It has to do with coaches' contracts in our various institutions, that is, the responsibility of the coach to the institution, the responsibility of the institution to the coach, etc. I have the feeling, in reading them over, that they do not apply specifically to the track coaches. However, I feel that we should include them in the minutes so I will dispense with the reading of this material and it will come to you in the complete report of the Notes.

STATEMENTS AND RECOMMENDATIONS REGARDING COACHES CONTRACTS
(As adopted by the N.C.A.A. Council)

1. An individual as well as an institution should recognize the moral responsibilities inherent in respecting and fulfilling contractural agreements.
2. An institution should enter into a contractural agreement with a coach similar to those entered into with other members of the faculty and such a contract should include the assignment of faculty rank, benefits of tenure and retirement and such other rights and privileges as are enjoyed by other members of the contracting institution's faculty.
3. When a contracting institution makes special concessions to a coach, these should be set forth in detail in the contract and accepted as legal and binding in the same manner as the other provisions of the contractural agreement.
4. All salary agreements between a coach and an institution should be stated in the contract and such salary should come from sources under the administrative control of the institution.
5. An educational institution seeking a coach who is under contract to another educational institution is morally obligated first to contact the institution which holds the agreement with the coach and secure permission to negotiate with him.
6. A coach should not enter into negotiations with a second institution during the term of a contract without first notifying the institution which is a party of his contractural agreement, and he then should keep the first institution's administration informed concerning his negotiations.
7. No institution should engage the services of a coach prior to his release from any contractural obligations to another institution.

May 20, 1955

(President Doherty) The next item has to do with various discussions that have taken place in various parts of the country relative to the selection of the Olympic coaches for 1956. These discussions have for the most part been informal, whenever coaches got together However, at the IC4A meeting in New York a motion was passed, unanimously, in which certain recommendations were made to the selection committee–the committee that has been formed for the selection of the coaches. They did take formal action and in general, the action they took is similar to the action that we are about to bring before you. The action was mailed to each member of that committee. There has been discussion since that time and specifically a discussion of the matter at our Executive Committee meeting on Wednesday. It was emphasized at that discussion that we did not intend in any way to direct the opinions or to unduly influence the opinions of the selection committee, but rather that we hoped to be helpful to them in their difficult, almost impossible task of selecting these men I, personally, have talked to eight or perhaps nine members of that selection committee, just informally, on a friendly basis. In each case the members of the committee made the statement that they would welcome anything from organizations, the various associations, college associations, or from the NCTCA, or from individuals, that they would welcome any opinion relative to the matter and would give them due consideration in reaching a final decision. So the intent, throughout, is to be helpful and there is no intent other than that. At our Executive Committee meeting we did draw up a proposal and it was suggested at that time that George Rider, on the basis of his years of experience in this organization, as past president etc, would present to you at this time the recommendations from the Executive Committee. They are simply recommendations put before you for any action you wish to take.

(Rider) I am simply reporting the action taken by the Executive Committee.

TO: All members of the Olympic Men's Track and Field Committee

FROM: National College Track Coaches Association

RE: Selection of Olympic Track and Field Coaches

At a meeting of the N.C.T.C.A. Executive Committee, held on Wednesday June 15, 1955, a motion was made and unanimously passed by all members present at the meeting that the following statement and recommendations be mailed to each member of the Olympic Track and Field Committee for the selection of American Olympic Coaches:

The members of the National Collegiate Track Coaches Association, at their regular annual business meeting in Los Angeles, June 17, 1955, wish to express their appreciation and understanding of the difficulties of your task in selecting the 1956 American Olympic Coaching Staff.

Further, we are aware of the great importance of choosing men who will not only promote American success in Olympic competition, but who will also, by their tact and good sportsmanship, further the mutual respect and good will between nations, to which the Olympic Games are dedicated.

To accomplish these goals we respectfully recommend to your committee:

FIRST, that experience as an assistant coach on any previous Olympic Staff should be considered a prerequisite to selection as Head Olympic Coach;

SECOND, that the professional competence of the Head Coach, as judged by his long time success in college coaching, should be beyond question, and

THIRD, that the importance of the role of all Olympic coaches as representatives of the United States before the world, should be recognized by rating such qualities as tact, poise and diplomacy as essential characteristics of every man chosen for the Coaching Staff.

The above motion was passed unanimously. Coaches present represented forty-two (42) colleges of the National Collegiate Athletic Association.

(President) May I suggest before any action is taken that the word "unanimously" is perhaps out of place there. If it does become a unanimous action, it can be included later but we could hardly know at this time whether it will be unanimous. So if you will please strike that out.

(There was some discussion on the motion, mostly asking for clarification. It was brought out that it was not to be considered in any way a criticism of former coaches. If passed, a copy of the resolution is to be sent to each member of the committee. The motion was made by Botts, seconded by Weiland. The vote was unanimously favorable. It was moved that the word "unanimously" be re-inserted into the text of the resolution. Seconded and passed. There was a suggestion that all the coaches present list their names to add strength to the report but it was agreed that the word "unanimously" made it superfluous.)

(President) We still have two matters before us; one is the report of the Nominating Committee but

before we have that I'd like to comment a little–you may call it the President's Report, if you will. We do have, as you know, a set of by-laws. They were formulated some two years ago. We have been going over these by-laws in the light of what we hoped to accomplish at this meeting and are aware of the fact that although they are a wonderful improvement over what we didn't have before, that there still can be a definite improvement for the future in the way of clarification of offices and procedures for business, committees and their duties, etc. Let me be specific: we do have an Advisory Committee. There is one member for each of the districts in the United States. They are elected by your membership for six years. There is no statement as to their duties other than what is implied by "advisory", except to say that they are members of the Executive Committee. I am not aware that they have been active during the year or even that they have been active at meetings. It is our opinion that those men could be used to much greater advantage if, in a sense, they became the focal point within their own districts for all promotion of track, for all promotion of membership in this organization, possibly for the conducting of clinics in their particular districts–whatever action they might want to take there. In effect, they would be our representatives throughout the entire year in that district. There are half a dozen other items that we have come across in the by-laws that need clarification or expansion and therefore I should like to recommend to the in-coming president that a Constitution Revision Committee be appointed–to begin action at once, that he appoint them at this meeting and that they start work in the fall and be ready to report to us next June.

Secondly, I would like to comment for just a moment on the subject of the clinics that we have had. Our last three clinics have placed very heavy emphasis upon the scientist, psychologists, physiologists and others who are interested in and have preferably been active in Track and Field activities. We haven't always hit the ball; perhaps we have fouled out on several occasions but I think that in general these men have been most interesting and have brought materials to us that are not available to us within our own group. I know the men in New York were just tremendously interested in Dr. Jokl. They kept him on for some hours–wouldn't let him go–asking questions on his researches in Germany, his work on marathon runners, etc. You men who were here yesterday morning heard Dr. Cole, the psychologist from Occidental; you heard an excellent lecture. He is a man who has an understanding of Track as well as of human nature and I think if we had given him more time and more opportunity he could have given us a lot more of practical value to us. Dr. Morehouse and Dr. Cooper yesterday morning were giving us substance and telling us straight: "This is supported by the facts, this is opinion," etc. It's a lot easier to get down to rock bottom that way than to say, "Well, at Podunk we do this and it has worked for us". They have facts and they can give us references and they can support their statements by scientific materials. Now perhaps we have gone a little too far in that direction, and it might be that we should swing a little toward our earlier clinics in which our own membership, our own champions held forth, as we did, say, in Ann Arbor when Dutch Warmerdam and Boo Morcom spoke on the Pole Vault in addition to having Dr. McNeil talk on motivation. That combination of balance between practical work and science, if you wish to call it that, I think is important and personally I recommend that that approach be continued in the future.

Thirdly, and this is my last point, that we are so aware of our lack of money in terms of doing many things that this organization ought to do. It seems to me we have made a lot of progress in the last few years. During this last year, as President, I thought of this we might do and that we might do–the future is almost unlimited. This body ought to be the one to stimulate Track and Field throughout the United States, not only at the college level but at the high school level as well. We ought to be drawing upon all the available sources for the improvement of Track and Field. This matter of loop films that was discussed this morning is just beginning. Over in Europe I think they are doing a grand job along these lines because they have had to do it. Consider that we are doing wonderfully well in this country, of course, in our Track and Field, but consider little Finland with four millions of population was able to win 27 gold medals compared with our population of–well, at least 25 or 30 times that many–and we won 50 gold medals. Sure, we've been winning but on a percentage basis I am not sure that we have done so well. It has been my opinion that these people, Valste in Finland, for example, could show us quite a few things in the way of accomplishing more in less time. If we had money, we could do so many things in the way of publication, in the way of setting up, if you will, a research center for Track and Field. Suppose that Morehouse and Cooper and Cole, who were here yesterday, were to get together with Jokl in New York and McNeil, the psychologist last year, and Frank Ryan, who is right in the field, and let's say half a dozen of us in a convention at this time of year, meeting on Tuesday and Wednesday perhaps before we do, and threshing out the problems of Track and Field from their standpoint, organizing the problems, organizing the literature, etc, and then reporting to us when we have our regular clinic. I think that tremendous improvement could come from such a meeting and again I would recommend that.

Now let me add a few thanks. Your thanks and mine to Payton Jordan, our Vice-President this last year. It is a tremendous job to set up this clinic and all the related matters. I can think of all my correspondence with Payton Jordan and the many letters he wrote to me on getting this or that man, about getting tickets for them–so many items–it's been a big job and Payt has done it wonderfully well. You men who have been here can best appreciate the work he has done. To Phil Diamond–I have already spoken of his excellent work on the minutes, and certainly to H. D. Thoreau for that marvelous job he did last night in getting all that material together ahead of time and having it ready for us so as to cut the drawing time approximately in half. I think we ought to thank H. D. individually and we should thank him officially for the work he has done. It has been a privilege to be with you as President and frankly, I am so filled with the possibilities for the future, that I hope that it will be possible to maintain some definite connection in the next few years and perhaps help us all to move forward."

The next item was the report of the Nominating Committee, which consisted of Clyde Littlefield as Chairman, Carl Olson and Harry Adams. Mr. Littlefield presented the report. He expressed the thanks of the entire group to Ken Doherty, Payton Jordan and the other officers for their work and then presented the slate of nominees. It went as follows:

For President: Payton Jordan
For Vice-President: Bud Winter
For Secretary-Treasurer: Fran Dittrich
For Recording Secretary: Phil Diamond

For the vacancies on the Advisory Committee:

District 2: Bob Grieve of Syracuse
District 3: Dale Ranson of North Carolina
District 6: Oliver Jackson of Abilene Christian

Fred Tootell moved that the slate be considered as one ballot. Riley Best seconded. Motion passed. There were no further nominations from the floor and the slate was unanimously elected.

President-Elect Jordan took the chair to thank all the coaches present and to hope that next year's meeting and clinics would be as enjoyable as this one. The meeting adjourned at 12:10.

Respectfully submitted,

Phil Diamond, Recording Sec'y.

1955

ALL-AMERICAN TRACK AND FIELD TEAM

100 yard Dash	James Golliday, Northwestern University John Haines, University of Pennsylvania William Watson, University of Florida
220 yard Dash	Robert Gary, Washington State College James Golliday, Northwestern University Art Pollard, Pennsylvania State University
440 yard Dash	Russ Ellis, UCLA Charles Jenkins, Villanova University J. W. Mashburn, Oklahoma A. & M. College
880 yard Run	Thomas Courtney, Fordham University Peter Gray, University of Michigan Arnold Sowell, University of Pittsburgh
1 Mile Run	James Bailey, University of Oregon William Dellinger, University of Oregon Robert Seaman, UCLA
2 Mile Run	James Beatty, University of North Carolina Allen Frame, University of Kansas Ken Reiser, University of Oregon
120 yard High Hurdles	Milton Campbell, University of Indiana Charles Pratt, Manhattan College Joel Shankle, Duke University
220 yard Low Hurdles	Leon Clarke, University of Southern California Jack Mathews, University of Iowa Charles Pratt, Manhattan College
High Jump	Bernie Allard, Notre Dame University William Lee, University of Pennsylvania Ernie Shelton, University of Southern California
Broad Jump	Mal Andrews, University of Arizona Frank Herrmann, Stanford University Joel Shankle, Duke University
Pole Vault	Don Bragg, Villanova University Walt Levack, University of Southern California Ron Morris, University of Southern California
Shot Put	Thomas Jones, Miami University (Ohio) William Nieder, University of Kansas Don Vick, UCLA
Discus Throw	Ron Drummond, UCLA Des Koch, University of Southern California Carl Vereen, Georgia School of Technology
Javelin Throw	Les Bitner, University of Kansas Al Cantello, LaSalle College Jerry Church, Oregon State College

Chosen after the NCAA Meet by National Track and Field Rules Committee Brutus Hamilton, Chairman